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CHARLES REX.

CHARLES *the Second, by the Grace of God King of* England, Scotland, France, *and* Ireland, *Defender of the Faith, &c. To all the Nobility and Gentry of Our Kingdoms of* England, Scotland, *and* Ireland, *and to all other Our Loving Subjects of what Degree and Quality soever, Greeting: Whereas* Richard Blome *of* London, *Gentleman, hath Informed Us, That he hath employed his Time, and been at great Expences in preparing for the Press a Volume to be Entituled,* The Gentleman's Recreation, *Treating of* Hawking, Hunting, &c. *as by his Proposals it doth further appear. And being given to understand by the Certificate of several Persons of Honour, That the Work will be of great use, and acceptable to all Our good Subjects, and especially to the Nobility and Gentry, We have thought fit, at the humble Request of the said* Richard Blome, *to declare Our Royal Approbation to the said Undertaking: And out of Our Princely desire to promote all such commendable and useful Works; and the better to embolden him to finish this Volume now in hand with, We do hereby recommend his said Endeavours unto you, to the end that by your Subscriptions you may encourage him to perfect and finish the said Book. And, Whereas we are Informed, That the said* Richard Blome *will be at great Charges to perfect the same, by reason of its being Illustrated with divers Sculptures, as Engines, Nets, and the like, relating to the said Sports of* Hunting, Fowling, &c. *We do by these Presents strictly charge and prohibit all Our Subjects, within Our Kingdoms of* England *and* Ireland, *to Reprint the said Book, in whole, or in part, within the term of Fourteen Years, without the Consent and Approbation of the said* Richard Blome, *his Executors or Administrators, as they will answer the contrary at their Perils, whereof the Master and Wardens of the Company of* Stationers *are to take Notice, that the same may be entred into their Register, and due Obedience to be yielded thereunto.* Given at Our Court of *White-Hall* the 14*th* Day of *February* 168$\frac{4}{5}$, in the 35*th* Year of Our Reign.

By His Majesties Command.

SUNDERLAND.

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THE

Gentlemans Recreation.

In Two Parts.

The First being an

ENCYCLOPEDY

OF THE

ARTS and SCIENCES.

TO WIT,

An Abridgment thereof, which (in a clear Method) Treats of the DOCTRINE, and GENERAL PARTS of each ART, with ELIPTICAL TABLES, comprehending a Summary and General Division thereof; being a TRANSLATION from the most Authentick AUTHORS, by Persons well Experienced therein.

TO WHICH

Divers SCULPTURES, and SCHEMES, are added for the better Illustration, and Demonstration thereof.

THE SECOND PART,

Treats of

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WITH

A Short Treatise of COCK-FIGHTING; for the BREEDING, DYETTING, ORDERING, MATCHING, and FIGHTING them.

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Printed by *S. ROTCROFT*, for *RICHARD BLOME*, Dwelling at the Upper End of *Dutchy-Lane*, near *Somerset-House* in the *Strand*, MDCLXXXVI.

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TO

The moſt Auguſt

JAMES

THE SECOND,

By the Grace of GOD

KING of *England*, *Scotland*, *France*, and *Ireland*,
Defender of the Faith, &c.

May it pleaſe your Sacred Majeſty,

HAVING by the Encouragement of His late MAJESTY, and ſome Hundreds of the NOBILITY and GENTRY, Compleated a Work, which for divers Years paſt hath been my utmoſt Care and Endeavour, (with no ſmall Expence unto me) to render it Acceptable to the moſt Ingenious; as only deſigned for the Nobility *and* Gentry.

A *And*

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And well knowing how much Your MAJESTY *is affected to great Undertakings, conducing to the Publick Good, and Honour of Your Nation; And this (which without Arrogance) being Inferior to none, I have therefore (with the more Confidence) taken upon me the Boldness to make this my Humble Address to Your most Gracious* MAJESTY, *and to Implore Your favourable Acceptance of these my Endeavours; which thus Illustrated by Your Name, will give so much the greater Lustre to the Work it self, and Honour to the Publisher thereof, who is,*

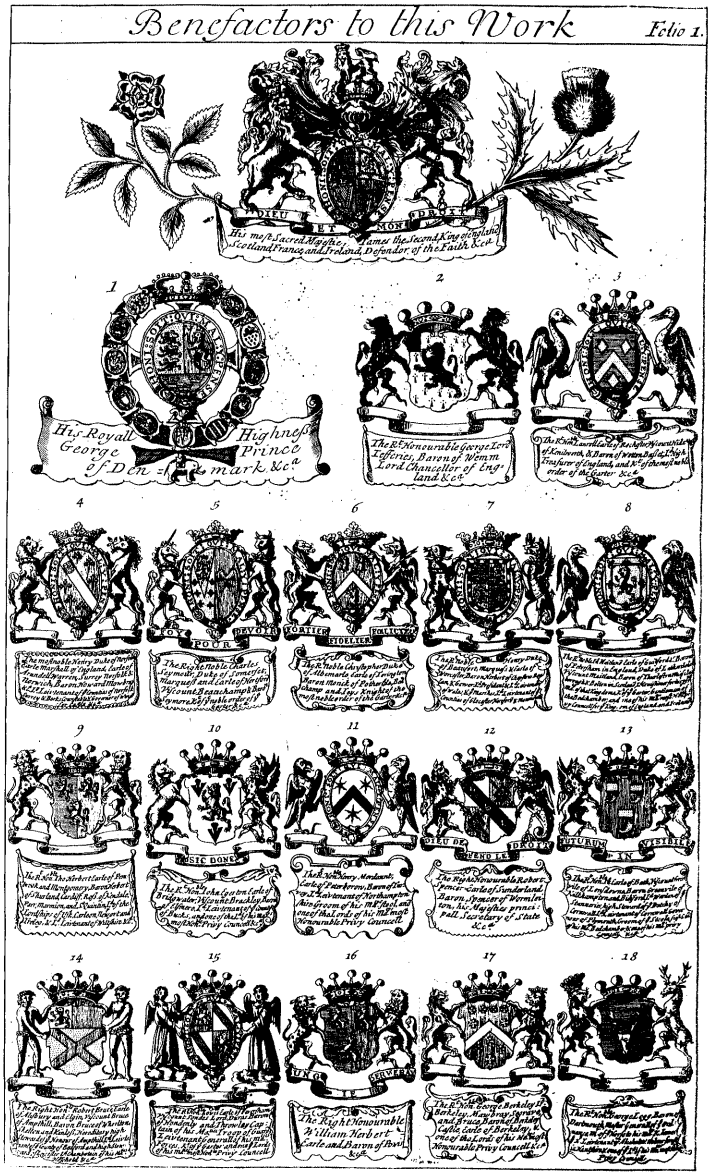
Dread Sovereign,

YOUR MAJESTIES

Most Obedient and Loyal

Subject and Servant,

RICHARD BLOME.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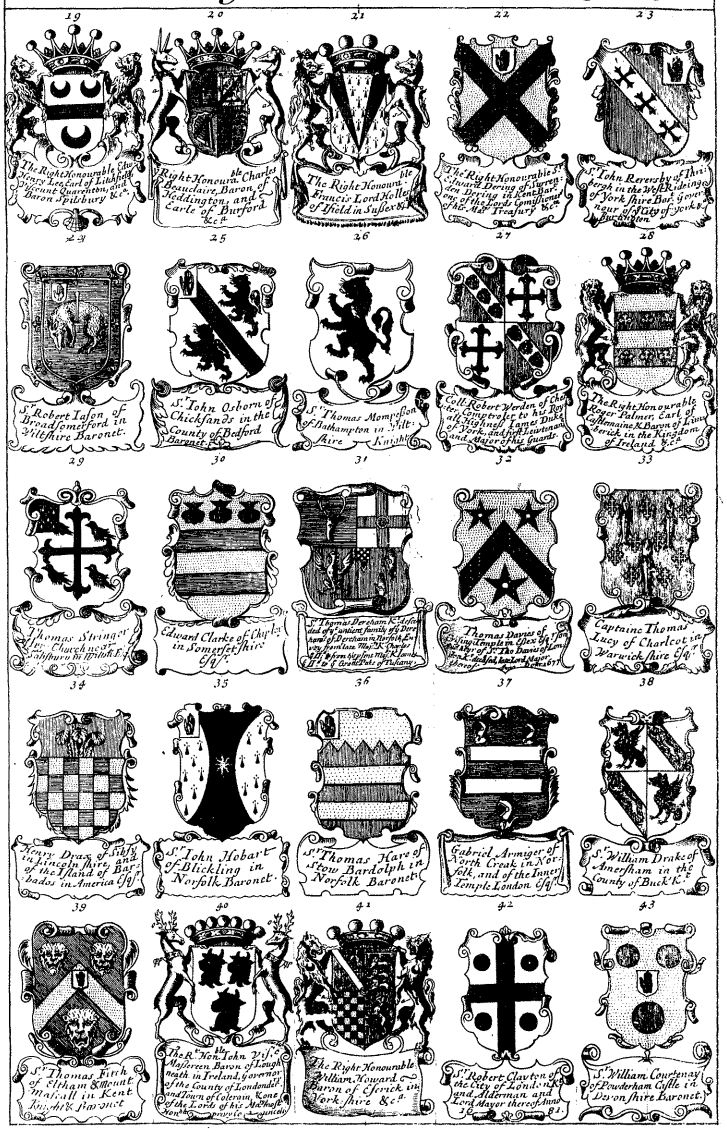
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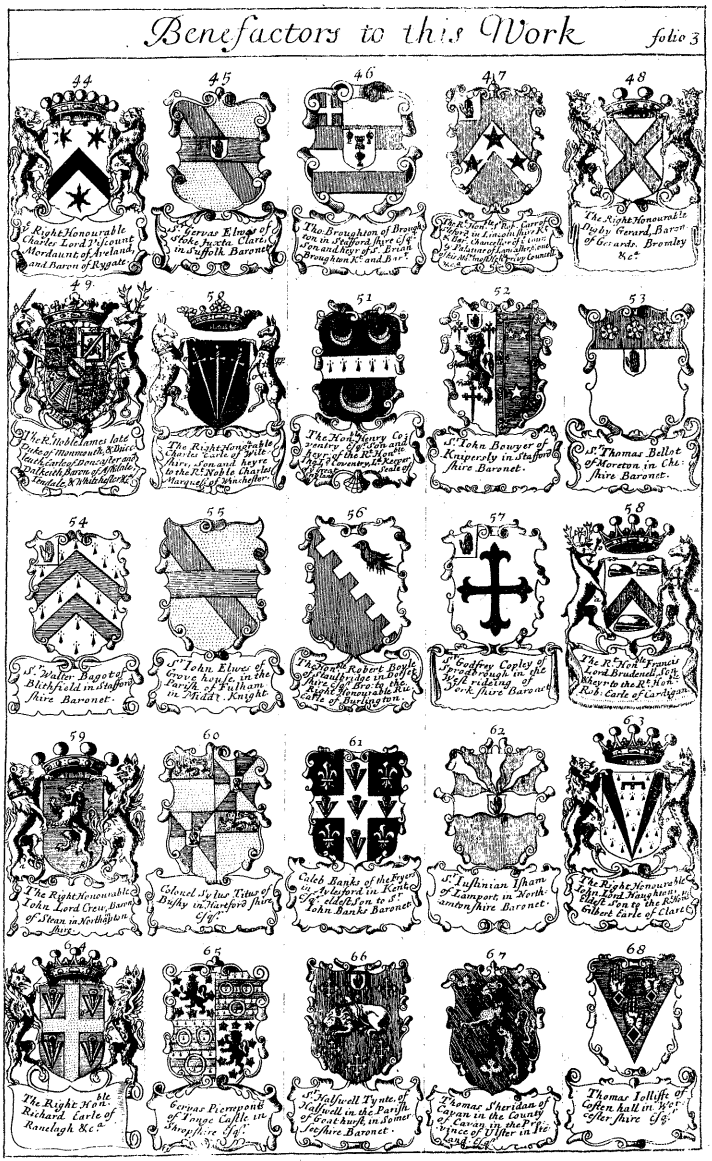
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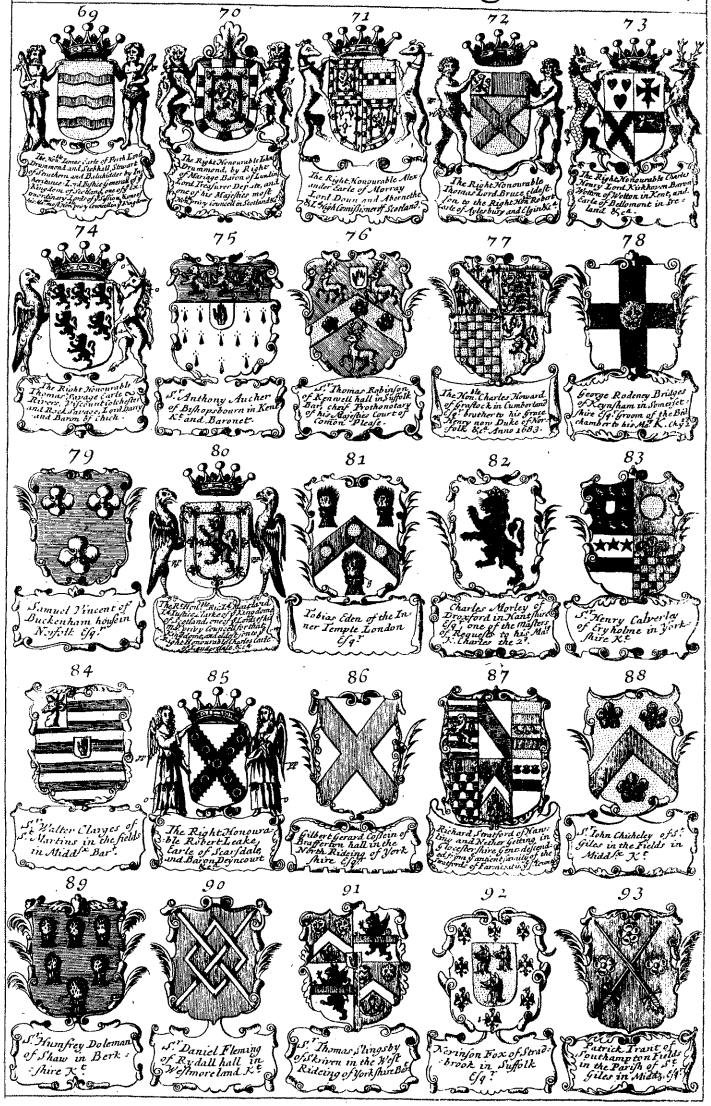
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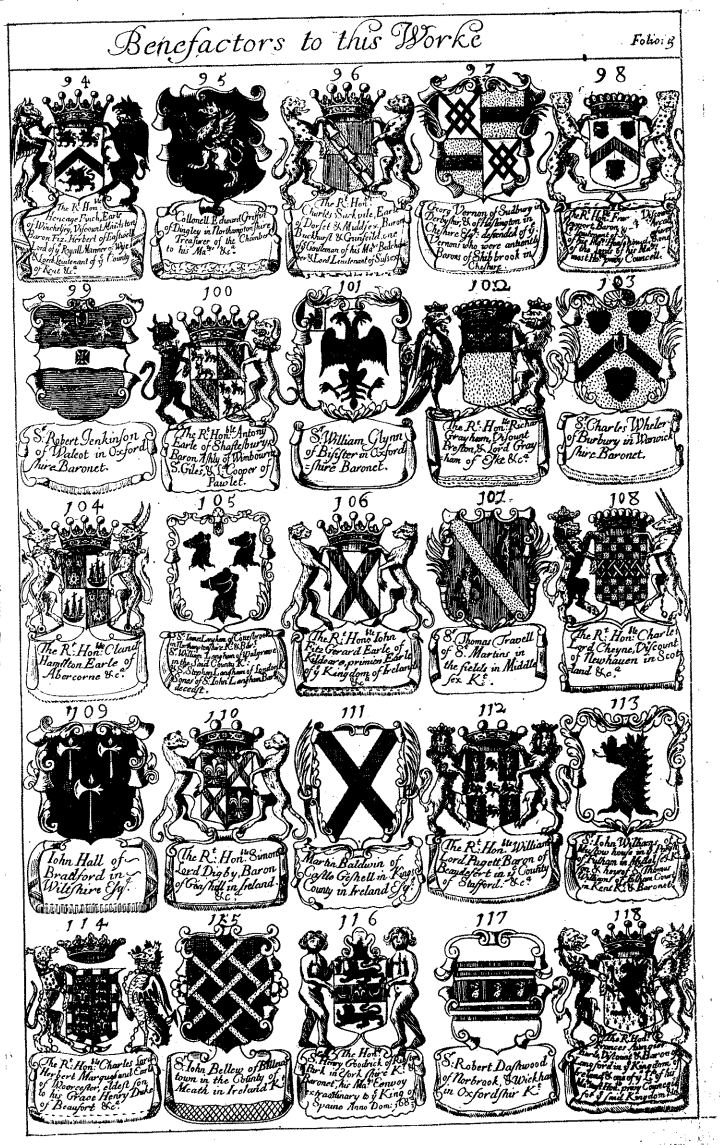
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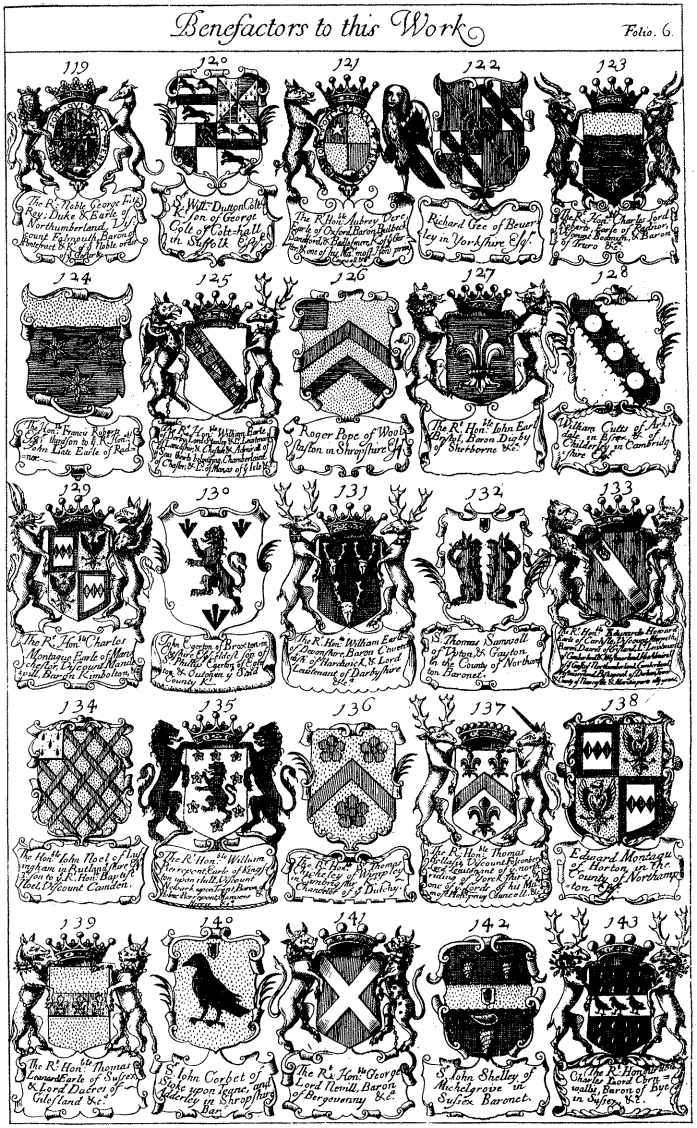
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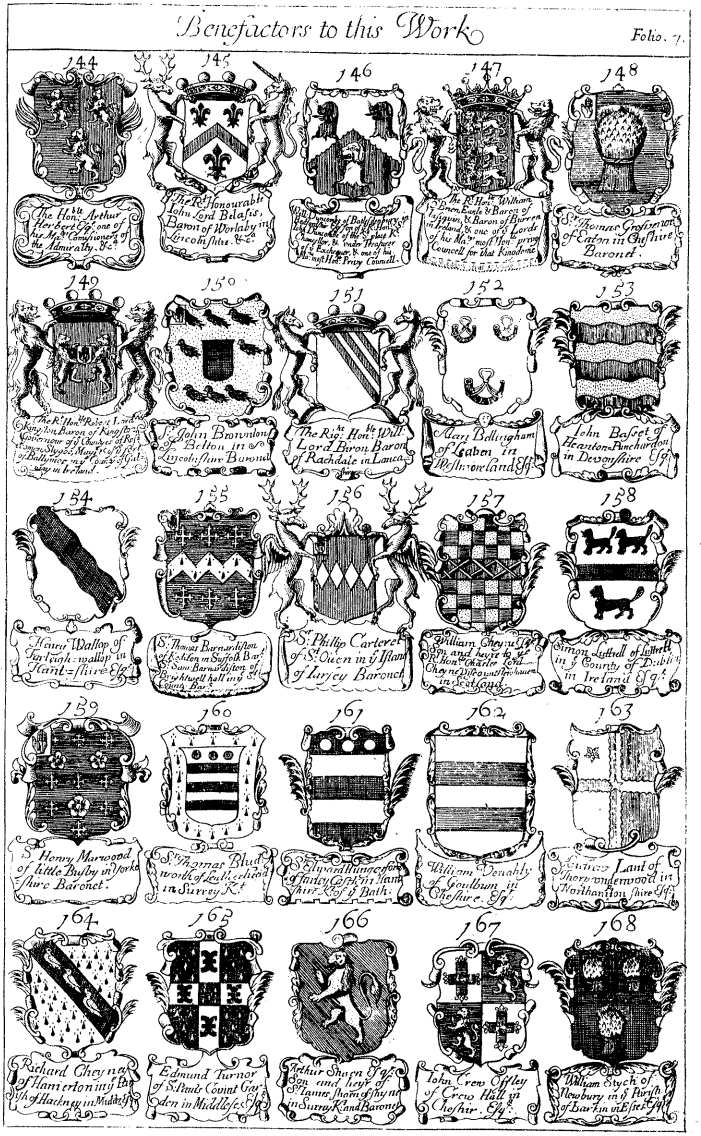
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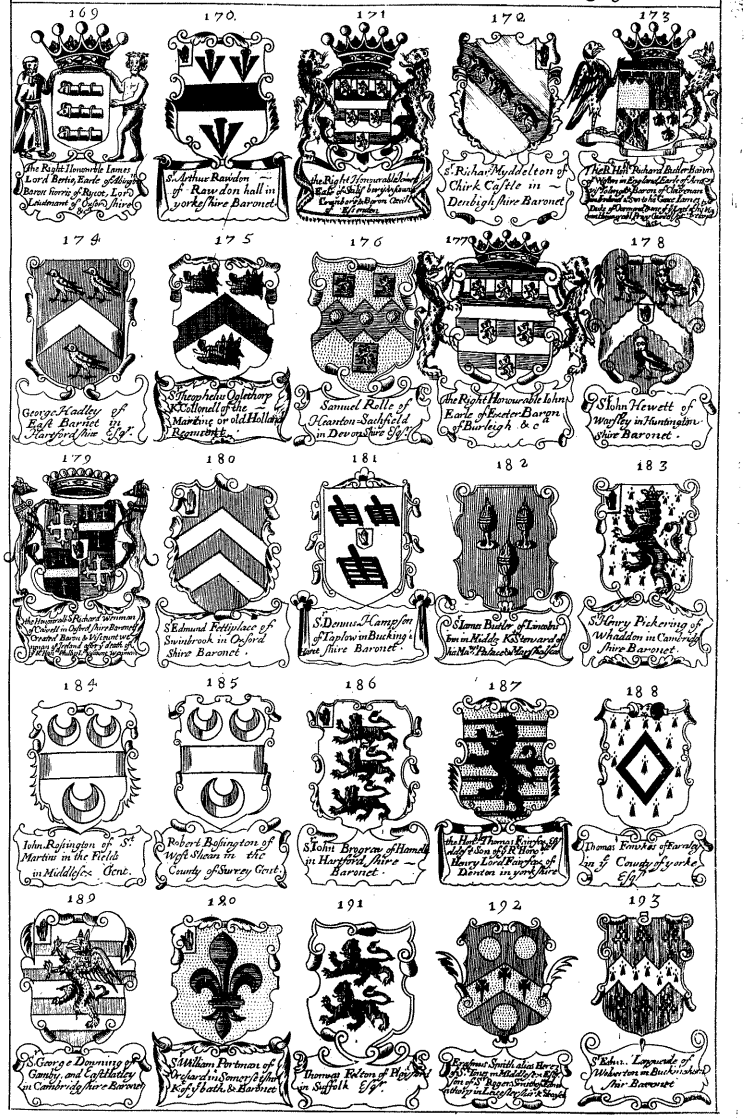
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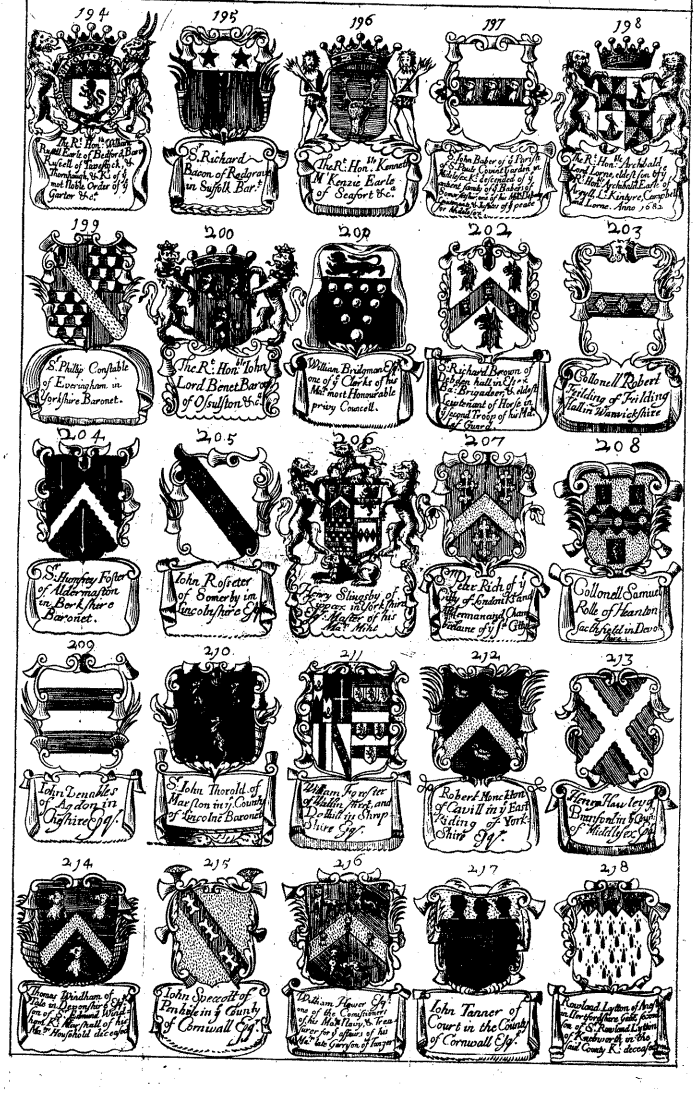
194
The R.t Hon.ble Wm Lord Russell Earle of Bedford & Baron Cursell of Thornhaugh &c. Knight of the most Noble Order of the Garter &c.
195
Sr Richard Rodgrave of Barton in Suffolk Bar.t
196
The R.t Hon.ble Kenneth M.c Kenzie Earle of Seaforth &c.a
197
Sr Iohn Baber of the Parish of St Paul Covent Gardens &c. Knight & Physician to the late Queen Katherine Consort to King Charles the 2d of Blessed Memory & one of the Physicians to his Ma.tie now being
198
The R.t Hon.ble Archibald Earl of Argyll Lord Lorne, Kintyre & Ila &c. Eldest Son & Heir apparent to the Most Noble Archibald Earl of Argyll & Kintyre Campbell Lord Lorne. Anno 1682
199
Sr Philip Constable of Everingham in Yorkshire Baronet.
200
The R.t Hon.ble John Lord Bonet Baron of Olsulston &c.
201
William Bridgman Esq.r one of the Clerks of the Ma.tie most Honorable privy Councell.
202
Richard Berenger of Huntington Castle in the Co.tie of Corke Brigadier & eldest Lieutenant of Horse in the second Troop of his Ma.ties Life Guards.
203
Collonell Robert Fielding of Fielding Hall in Warwickshire
204
Sr Humfrey Foster of Aldermanston in Berk.shire Baronet.
205
John Roseter of Somerby in Lincolnshire Esq.r
206
Henry Slaughy of Stanmore in the Parish of St Peter of the Ma.tie Mile
207
Peter Rich of the City of London Haberdasher Alderman & Chamberlaine of the City of London
208
Collonell Samuel Rolle of Heanton Satchfield in Devon
209
John Denables of Agecroft in Lancashire Esq.r
210
Sr John Thorold of Marston in the County of Lincoln Baronet
211
William Ingoldsby of Laxton Esq.r and Deputy Lieutenant of the County of Nottingham
212
Robert Hone Esq.r of Cavill in the East Riding of York Shire Esq.r
213
Henry Hawley of Buntsorden in the County of Middlesex Esq.r
214
Thomas Windham of Felbrigg in the County of Norfolk Esq.r Son & Heir of Sr Hen.y Windham of the Ma.ties Household deceased
215
John Speccott of Penheale in the County of Cornwall Esq.r
216
William Hooper Esq.r one of the Commissioners of the Ma.ties Navie & Treasurer for Sea affairs of his Ma.ties late Garrison of Tangier
217
John Tanner of Court in the County of Cornwall Esq.r
218
Rowland Leyton of Ingestre in the County of Stafford Esq.r Son & Heir of Sr Rowland Leyton of Wrottesworth in the said County Knight deceased

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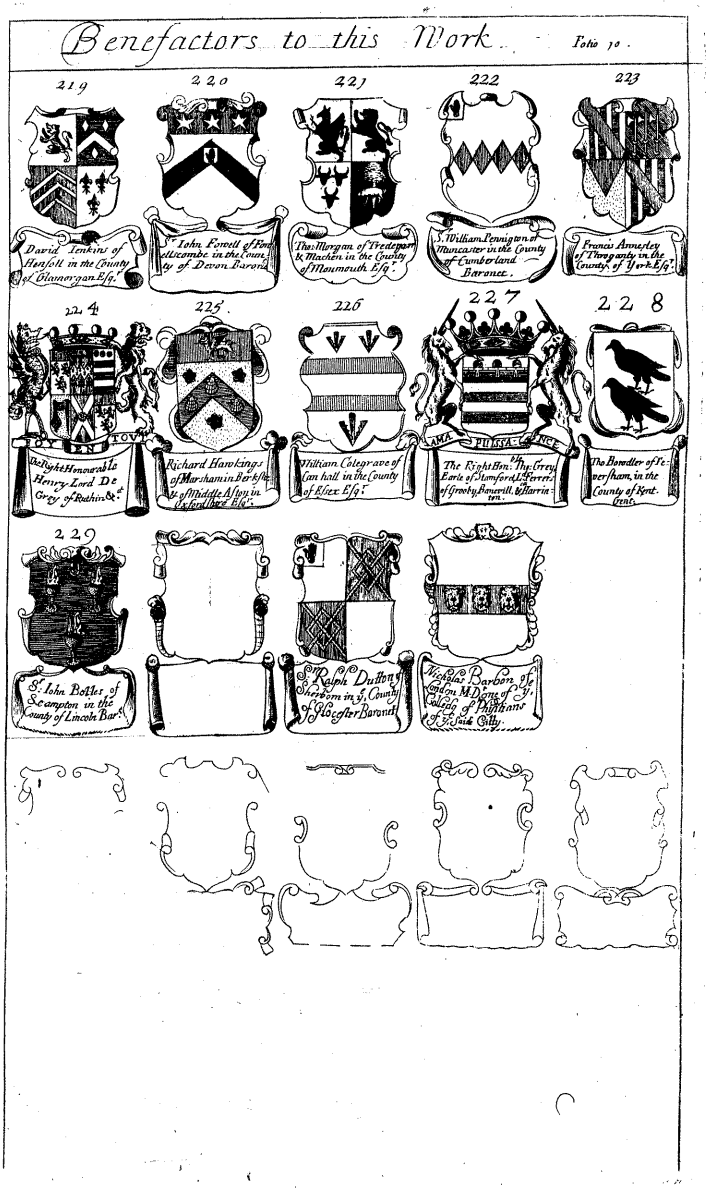
Benefactors to this Work.
Folio 30.
219
David Jenkins of Hensolt in the County of Glamorgan Esq.
220
Sr John Fowell of Fowelscombe in the County of Devon Baronet
221
Thos Morgan of Pentygarn & Machin in the County of Monmouth Esq.
222
Sr William Pennington of Muncaster in the County of Cumberland Baronet.
223
Francis Annesley of Thorpe Arch in the County of York Esq.
224
The Right Honourable Henry Lord De Grey of Rudhm &c.
225
Richard Hawkins of Marsham in Berks & of Middle Aston in Oxfordshire Esq.
226
William Colegrave of Gainhall in the County of Essex Esq.
227
The Right Hon. Thomas Grey Earle of Stamford Lord Ferrers of Groby Bonvill & Harrington.
228
The Bowdler of Feversham in the County of Kent Gent.
229
Sr John Bolles of Scampton in the County of Lincoln Bart.
Sr Ralph Dutton of Sherborn in ye County of Glocester Baronet
Nicholas Barbon of London M.D. Son of ye Colledge of Physicians of this City

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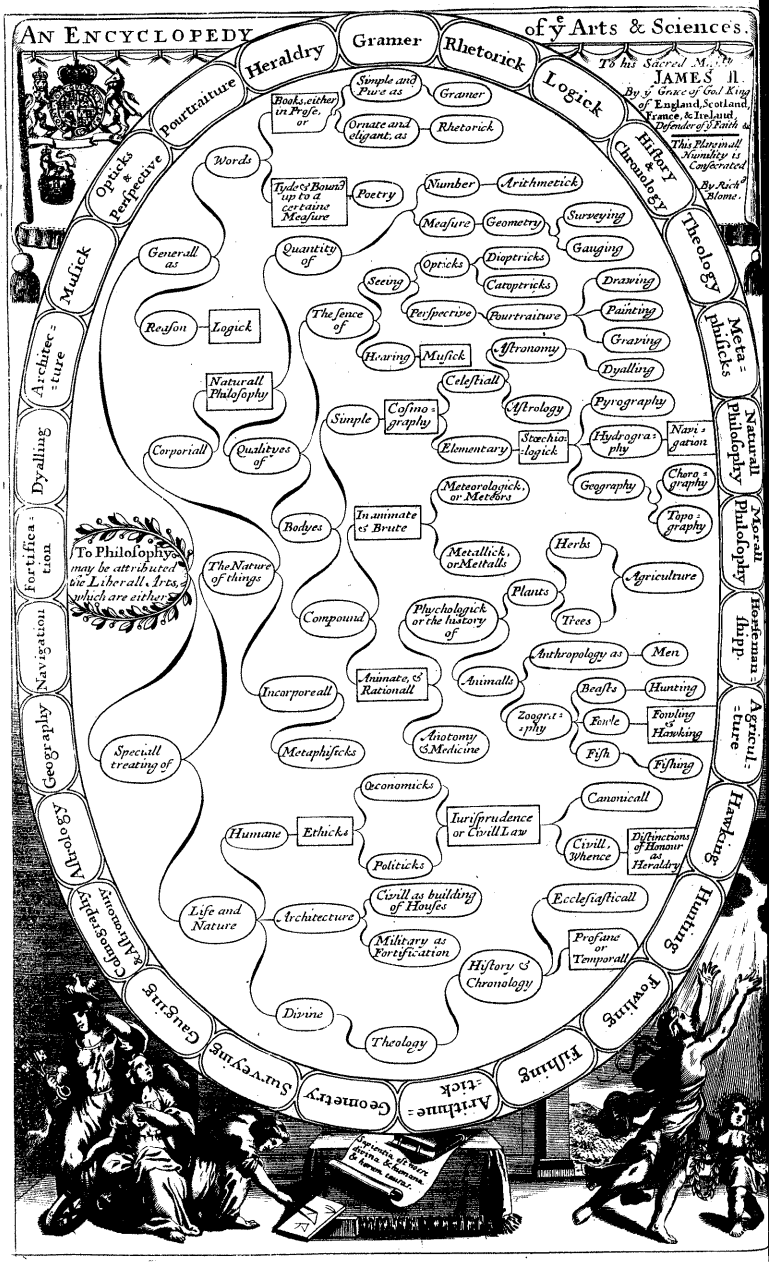

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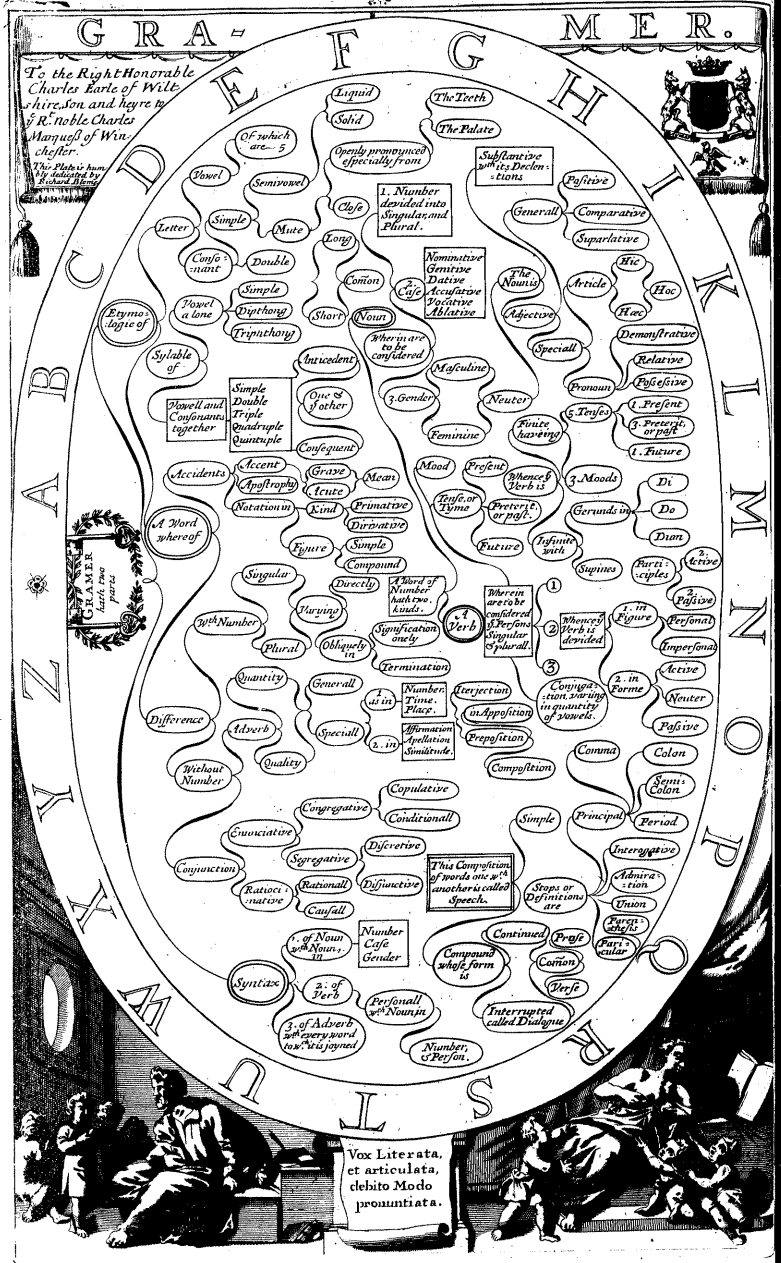
GRA- MER.
To the Right Honorable Charles Earle of Wiltshire, Son and heyre to ye R. noble Charles Marquess of Winchester.
This Plate is humbly dedicated by Richard Hodg
GRAMER hath two parts
Vox Literata, et articulata, debito Modo promuntiata.

THE PREFACE TO THE READER.

ANY Ages *since, and even from all Antiquity, the* Liberal Arts *have by Just Right been esteemed most Laudable and Profitable, especially to the* Nobility *and* Gentry, *in all things that concern* Human Life; *there being nothing more Noble and Excellent than* Instruction, *the true Imbellishment of the* Mind, *and Proof of a truly Accomplish'd* Spirit. *And this is no other than what a great* Philosopher *prudently alledged*, viz. That Human Life without Learning, was but the Image of Death. *To which purpose the* Poet, Ovid, *in his first Book of his* Pontus, *speaks as followeth,*

Adde, quod ingenuas didicisse fideliter Artes,
Emollit mores, nec sinit esse feros.

By Knowledge *Men aspire to the height of Vertue and Wisdom, and which is more, to the understanding of Divine things. By* Learning *we are made worthy the Favour of* Kings, *and* Princes; *and* Literature *not only celebrates and renders us Praise worthy in our* Life, *but makes our Renown survive to all Posterity. The Study of the* ARTS *and* SCIENCES *entertains Youth, rejoyceth Old Age; adorns* Prosperity, *and gives Refuge and Consolation to* Adversity. *'Tis a Pleasure in the* Closet, *a Companion in the* Field, *and a* Fellow-Traveller *in a* Journey.

Since therefore so great Advantages and Emolumenis are proposed to Persons studious in Learning; how laudable would it be for the Nobility *and* Gentry *to employ their chief Study therein.*

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The PREFACE to the READER.

Are we covetous of Riches? Learning *brought vast Riches to* Ariſtotle, Cicero; Virgil, Horace, Seneca, *and divers others. Hunt we after* Honour? Learning *hath promoted innumerable many Perſons to high Dignities. Deſire we* Recreation? *How many Pleaſures doth* Learning *afford. Seek we* Glory *and* Renown? Learning *ſooner purchaſes Immortal Praiſe, than the deſperate* Atchievments *of* War. *Are we for* Health, Activity, *and* Strength *of* Body? *'Tis* Learning *that ſhews us how to gain and preſerve them.*

Now ſeeing it is ſo manifeſt, that Nature *hath nothing more advantagious, more delightful and excellent than the* Arts *and* Sciences, *which are by the Induſtrious ſo eaſily attained unto, I have attempted (for the Publick Good) the* Printing *an* ENCYCLOPEDY *of the* Arts *and* Sciences *in our Native Tongue, to wit, an Abridgment thereof.*

The uſual Diviſion of the Arts *by the Ancients, were into Seven* Liberal, *and as many* Servile.

The Liberal were Grammar, Logick, Rhetorick, Muſick, Arithmetick, Geometry, *and* Aſtronomy; *all which are briefly comprehended, together with their ſeveral Subjects contained in this* Diſtick.

Gram. loquitur, Dia. vera docet, Rhet. verba colorat,
Muſ. canit, Ar. numerat, Geo. ponderat, Aſt. colit Aſtra.

The Seven Servile Arts *were known by their ſeveral Profeſſors,* viz. *the* Agriculture, *the* Huntſman, *the* Military Perſon, *the* Navigator, *the* Chirurgeon, *the* Weaver, *and that ſort of Artificer which the* Latins *called* Faber, *who according to the Material he Worked in was denominated; as* Faber Lignarius, *the* Carpenter; Faber Ferrarius, *the* Smith, *and the like. And both the* Liberal *and* Servile *are all enumerated together in another, yet more compendious and comprehenſive* Diſtick.

Lingua Tropus Ratio, Numerus, Tonus Angulus Aſtram,
Rus, Nemus, Arma, Ratis vulnera, lana Faber.

But in regard this Diviſion *is not large enough to comprehend all the Parts of Knowledge reduceable to a* Syſtematical Method, *'tis thought neceſſary to widen the ſaid* Diviſion *into a more Ample* Sphære, *which might be divided into* Moral, Prudential, Mathematical, Liberal *and* Mechanical Arts. *But leſt by this Diſtinction many of them ſhould interfere one upon the other, it is judged moſt proper, and ſufficiently Methodical to treat of them apart, and that according to the Method as they are encircled about the firſt and general* Table *of the* Work.

Nor will it be deemed unneceſſary if I here give you a Summary of the ſaid Work.

PHILOSOPHY, *according to the general Acceptation, is the Study of* Wiſdom, *comprehending the Knowledge of all Things both* Human *and* Divine, *as well as of the Cauſes whence they are derived, eſpecially as it is now found Methodized in the ſeveral* Syſtems *of the* Arts *and* Sciences.

Now Science *is nothing but a comprehenſion of* Definitions, Diviſions, *and* Examples, *ſutable to the Natural uſe, by which the ſaid* Science, *and all its* Parts *and* Parcels, *are Illuſtrated, and Explained.*

Some of the ſaid Liberal Arts *are General, and ſome Special.*

Thoſe are called General, *and* Common, *which have reference to all things in General, and are aptly extended through all the Parts of Knowledge, or Wiſdom; for Men may either ſpeak Purely and Simply, or Ornate and Elegant, and Diſpute of all things. Thus they are the Inſtruments of* Philoſophy, *and are thence properly called* Organical, *for that they appertain totally to* Speech *and* Reaſon; *and therefore they are likewiſe called by many* Logical.

Some of the General Arts *are concerned in* Speech, *and others in* Reaſon.

Of

The PREFACE to the READER.

Of the Firſt, ſome in pure and congruous Speech, as Grammar; *or others in Ornate and Eloquent Diſcourſe, and either Free and in Proſe, as* RHETORICK *and* ORATORY; *or tyed and reduced to certain Meaſures, as* POETRY. *That which hath regard to* Reaſon, *is* LOGICK.

The Special, or Particular Arts (*which are alſo part of* Philoſophy) *are diſtinguiſhed and differenced by their Subjects, that is to ſay, thoſe relating to the* Nature *of* Things; *or to* Life *and* good Manners.

Nature is Corporeal, *or* Incorporeal. *Now the* Mathematicks, *and* Natural Philoſophy, *Treats of the* Corporeal Nature *of all Things; for the* Mathematicks *Contemplate and conſider the* Quantities *of things, and* Philoſophy *the* Qualities.

Quantity *is either of* Number, *about which* ARITHMETICK *is imployed: Or* Magnitude *and* Meaſure, *whereof* GEOMETRY *Treats, on which depend ſeveral Parts or Branches of the* Mathematicks; *amongſt which are* SURVEYING, *and* GAUGING.

The Senſe of Seeing *Creates* OPTICKS, DIOPTRICKS, CATOPTRICKS, PERSPECTIVE, *and* POURTRAITURE, *which comprehends* DRAWING, PAINTING, GRAVING, *and* ETCHING. *And the Senſe of* Hearing *is buſied about* MUSICK.

The Natural Body of Philoſophy is either Simple, or Compound; Simple, *whereof the* Natural Hiſtory *of the World Treats, which is either* Univerſal, *and is Termed* COSMOGRAPHY, *being the Deſcription of the* World; *or* Special, *and that again either* Celeſtial, *Treating about the* Heavens, Sun, Moon, *and* Stars, *which is Appropriate to* ASTRONOMY, *on which depends* DYALLING, *with its Influences, to wit,* ASTROLOGY; *or* Elementary, *concerning the Elements in General, which is called* STÆCHIOLOGICKS; *or in Particular, as of Fire called* PIROGRAPHY, *and of* Water *called* HYDOGRAPHY, *upon which depends* NAVIGATION. *Of all the* Earth, *as* GEOGRAPHY; *or of ſeveral* Countries *and* Regions, *as* CHOROGRAPHY; *or of particular places, as* Mountains, Valleys, Towns, *and the like, which is called* TOPOGRAPHY.

Natural Bodies compounded are partly Inanimate, *and* Brute; *and partly* Inanimate *and endued with* Life. *Again* Inanimate Natures *are either engendred, and bred in the* Air, *about which the* Art *therein concerned, is called* Meteorologick; *or in the Earth, as* Minerals, *whence the* Art *that Treats thereof is called* Metallick.

The Knowledge of Animate, *or* Rational *living Things comprehends the Hiſtory of* Plants, *and* Animals, *whence followeth the Art of* MEDICINE.

There are two principal kind of Plants, viz. Herbs *and* Trees; *the* Cultivation *whereof belongs to* AGRICULTURE, *which doth Expatiate it ſelf into divers Particulars, chiefly tending to* Food *and* Rayment, *as by* Cultivating *the* Earth, Breeding Cattle, &c.

Animals *are either rational, as* Man; *or Irrational, as* Beaſts. *The Deſcription of* Beaſts *belongs Generally to* ZOOGRAPHY, *under which are Comprehended* ICHTHYOGRAPHY, *or the Deſcription of* Fiſh; ORNITHOGRAPHY, *or the way of Keeping* Fowl; *and* CTENOTROPHY, *or* Paſtoral. *And under this Head of* ZOOGRAPHY, *may be comprehended the* Arts *of* HAWKING, HUNTING, FISHING, *and* FOWLING.

ANTHROPOLOGY, *teacheth the propriety of* Man, *and conſequently* ANATOMY *and* MEDICINE *follows after, as to the* Diſeaſes *and their* Cures.

Moreover, METAPHISICKS *Treat of the* Simple; *and* Incorporeal Natures *and* Things *which are Intelligent, as* Angels, Spirits, *and* Human Souls.

As to the Manners *and* Life *of* Men, *one is* Human *and* Temporal; *the other* Spiritual *and* Divine.

The

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The Doctrin *that Teacheth the* Moral Vertues *of* Human Life, *hath been by the* Antient Greeks *called* ETHICA, *and by the* Latins MORAL PHILOSPHY; (*the same* Cicero *expresseth better by the Name of* Offices) *of which there are two kinds, one in Administration of* Houshold Affairs, *called* OECONOMICKS; *the other in that part of the* Common-Wealth, *called* POLITICKS; *to which is to be referred* JURISPRUDENCE, or CIVIL LAW; *and likewise* HISTORY, *both* Prophane *and* Ecclesiastical, *whence proceed's* CHRONOLOGY.

ETHICKS *contain General* Theorems *and* Propositions; Jurisprudence, *more special.*

To this part of Life *and* Manners *belongs* ARCHITECTURE, *both Civil, as the Building of* Houses, &c. *and* Military, *as* FORTIFICATION; *also* TACTICKS *or* WAR; *with the* Distinctions, *as* Rewards *of* Honour, *which is* HERALDRY.

And whereas this Work *is designed for the Accomodation of the* Nobility *and* Gentry, *'its thought convenient to make an enlargment of those* Arts, *Peculiarly Appropriate to their Diversion, to wit,* Field-Sports, *as* Horsmanship, Hawking, Hunting, Fishing, *and* Fowling, *with so much of* Agriculture *as befits the Qualification of a* Gentleman *to understand; In which said* Arts, *great care has been taken to make them more correct and perfect, (according to the Practick Part now used in this our refined Age,) as doth appear by the* Work *it self, which is Illustrated with great Variety of useful* Copper Plates; *as also* Traps, Engines, Nets, &c. *for the better Explanation thereof, and the taking* Beasts, Fowl, Fish, &c. *the like never performed by any.*

But for the Satisfying the Curious, 'tis thought Convenient to give some Account of the Building up of this elaborate Work, *which hath taken up my whole time for these Seven Years past, and not without great Expences, as well to* Designers *and* Engravers, *for the* Sculptures, *as to* Authors, Printers, &c.

When first my Thoughts were for the undertaking this Design, *I consulted divers Eminent and knowing Persons, not only as to the first parts of the* Arts *and* Sciences; *but chiefly to the Second, which relates to* Field-Sports, &c. *to which our* Nobility *and* Gentry *are most addicted; And all approved thereof so well, that they gave me great Encouragement, to prosecute my Intentions; freely Contributing their several Assistances, giving directions what Measures to take, what* Authors *to make use of, and what Persons to address, that were esteemed Proficients in such and such things.*

As to the first part, Relating to the Arts *and* Sciences, *some* French Authors *were by their Advice Translated by Approved* Scholars, *and in particular a* System, *or* Compendium *thereof; which in a Brief and clear Method, Treats of the* Doctrin *and* General Parts *of each* Art, *with* ELIPTICAL TABLES, *Comprehending a Summary, and General Division thereof, Wrote by the Famous and Learned* Le Sieur de Savigne, *and Published by* Monsieur Bergeron, *Advocate of* Parliament, *for the Accommodation of the* French Gentry. *But by reason the said* Book *comprehended not all the* Arts *here Treated of, and that some were too short; Their Advice was to Insert those that were omitted, and to Enlarge those that were too short, and that by those that were well Experienced therein, whose Advice I have in all respects followed.*

GRAMMAR, RHETORICK *and* LOGICK, *were Translated from the said* Author, *with Enlargements by Mr.* Edward Philips, *who followed their Directions;* THEOLOGY, METAPHISICKS, *and* PHILOSOPHY, *both Moral and Natural, were done by Dr.* Thomas Sault; ARITHMETICK, *and* GEOMETRY *were Translated from the said* Author, *with some* Additions *from* Galtrichij, *by the Advice and Directions of the Right Honourable* Roger *Earl of* Castlemain; *to which the Practick parts of* SURVEYING *and* GAUGING *were added by an Experienced* Mathematician. COSMOGRAPHY, *and* ASTRONOMY *were Translated from the said* Author, *and* Galtrichij, *by the Directions of the Earl of* Castlemain; GEOGRAPHY *also Translated from the said* Author, *and* Galtrichij; *with Enlargments from* Varenius *his* Cosmography, *and* Sansons Geography; NAVIGATION *was taken from the said* Varenius, *and some Modern* Authors *of Esteem; and Digested into a Body by an expert* Navigator, *whose Name I am obliged to Conceal;* HISTORY *and* CHRONOLOGY *were Translated from the said* French Author; *with Enlargments taken from Eminent* Authors, *by a Student at* Oxford; DYALLING *was a Translation from* Galtrichij, *by the said Mr.* Phillips; ARCHITECTURE *was Composed by Sir* Henry Hobert *of* Blickling *in* Norfolk; WAR *and* FORTIFICATION *were Writ by Mr.* George Leslie, *and approved by several Knowing and Experienced persons, both here and beyond* Seas; Musick *was Translated from the said* Author, *with Enlargements made by a Person of Honour;* OPTICKS *and* PERSPECTIVE *were Translated from the said* Author, *and* Galtrichij; POURTRAITURE, *and* PAINTING *were taken from a* Manuscript, *recommended to me by Sir* Peter Lely; *And* HERALDRY *I Composed, being an Abridgment of the Body thereof.*

Thus in brief, I have given a Candid Account of the Building of the first Part. The Second Part was gained with far more Difficulty, by reason of the many gross Errors *committed in all* Books; *who for the Generality, follow the Footsteps of one another, without endeavouring the Corrections in any particular.*

My first Foundation of this Second Part, was a Translation from a French Author, *Entituled* Le Ruises Innocent; *being recommended as the best of that Subject, extant in any* Language; *This* Book *being Translated, my next Business was to Collect all our* English Authors *of the said Subjects, worth the Supervizing, as* Turbervile, Markham, *and others, (although stuft up with more Errors than Truths,) and Methodically Digested the whole into one entire Body; Next followed my Laborious Task, to get them Supervised, and Rectified by such* Sports-Men *as were approved Excellent; which took me up above four Years, as being Constrained to Consult so many; for some I found Expert in some part of* HAWKING, *and Deficient in the rest that their Genius was not Addicted unto; as some for* Short-winged Hawks, *as the* Gothawk, &c. *not regarding* Long-winged *ones, as the* Gerfalcon, Falcon, &c. *which to others were in the highest Esteem; others were good* HUNTSMEN *for the Chase of the* Fox, *as being their chief delight, but indifferent for the* Hare; *whilst others delighted therein more, than in that of the* Fox; *and others were principally for the* Stag *and* Buck; *others were good in some particulars in each* Art, *as some for the* Setting-Dog *and* Partridge; *others for Training up, and making* Dogs *for the* Gun, *and* Setting; *others for* Shooting Flying; *others for knowing the Haunts of* Beasts *of* Chase, *and* Fowl; *and how to take them by* Traps, Snares, Engines, Baits, &c. *some again Boasted themselves great* Sportsmen *in the whole, having some Notions and Smatches in common things, talking a great deal to no purpose; And for* FISHING *and* AGRICULCTURE, *I met with the like Difficulties, especially in the latter, some being expert in* Flowers, *others in* Seeds *and* Plants, *others in* Raising, Grafting *and* Inoculating Trees, *and others for the Improvement of* Grounds; *so that I was forced to make use of (for the Generality) as many Persons as I had Subjects to Treat upon; and for many, had the Assistance of two or three; nor was it without great Difficulty, to get many of them to impart their Knowledge unto me, as unwilling to make it publick; neither did I rely upon that which I received from one, but shewed it to others, also expert therein, who oft made* Corrections *and* Enlargements; *so that I presume in Modesty to say, it is a Work Worthy the Acceptance of any* Gentleman, *as not being too long to weary the Reader with Tedious Discourses; Thus observing the humour of our Age, which is for* Multum in parvo, *makes me hope it will meet with a favourable Reception.*

In all these Tracts of the Second Part, *there is only two that were done by Particular Persons, the one is* HORSMAN-SHIP *writ by* John Cuts *of* Childerley *in* Cambridg-shire Esquire, *a Person of approved knowledge in all things relating to the said Subject; and the other of* HAWKING, *which was composed by the assistance of Sir*

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The PREFACE to the READER.

Ralph Dutton *of* Sherborn *in* Glocester-shire, *and* George Russel *of* Abbots-Aston *in* Buckingham-shire, Esquire, Sergeant *of his Majesty's* Hawks, *both long experienced* Falconers; *and I doubt not but that they are so well performed that they will give general Satisfaction. The other* Treatises *went through so many hands, that it were tedious to repeat their* Names.

Nor do I doubt, but that the Nobility *and* Gentry *will reap Advantage by this Work; for by this means they are furnished with what is esteemed sufficient for the true Knowledge thereof, in a pure and clear Method, and are freed from the great charge and trouble in gathering together many* Volumes, *and those perhaps after a Confusion of their* Opinions *in* Method, *or otherwise, not profitably useful unto them.*

A N

ACCOUNT

of the several

ARTS AND SCIENCES

Treated of in this WORK.

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The Division of the abovesaid Arts *and* Sciences *as to their Parts doth appear in the* Eliptical *Tables at the beginning of each* Art.

GRAM-

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GRAMMAR.

PART I.

GRAMMAR is the Art of well Speaking, whether in *Profodie* or *Orthography*; that is, in true *Pronuntiation* or *Writing*, and conſiſts of two Parts, *Etymology* and *Syntax*.

Etymology is the firſt part of *Grammar*, declaring the proprieties of *Letters*, *Syllables*, and *Words*.

A *Letter* is one Indiviſible ſound in a Syllable, whereof there are two kinds, *Vowels* and *Conſonants*.

A *Vowel* is a *Letter*, which ſimply of it ſelf makes an entire ſound; and amongſt the *Alphabet* of *Letters* there are theſe five *Vowels*, *a, e, i, o, u* (as to y it is *Greek*.) Out of theſe *Vowels* variouſly diſpoſed, are compoſed five *Dipthongs*, viz. *æ, au, œ, ei, eu*; beſides *Tripthongs*, compoſed of three *Vowels* joyned together, as *eau*.

The reſt are *Conſonants*, whereof eight are called *Mutes*, viz. *b, c, d, g, k, p, q, t*; the other ſeven are *Semi-vowels*, viz. *f, l, m, n, r, ſ, x, z*.

A *Conſonant* is a *Letter*, which can't make an entire ſound of it ſelf, but requires thereto the aſſiſtance of a *Vowel*.

Of the *Semi-vowels*, ſome are called *Liquids*, as *l, m, n, r*; and ſome *Solids*, as *ſ, x, z*.

The *Liquids* are ſo called, not as being never ſolid; but becauſe they are ſometimes liquified, and as it were diſſolved in their ſounds.

S is a *Letter* that hath its proper power.

The *Solids* are thoſe which are never liquified, as *F*, and alſo *J* and *V*, which oft-times become *Conſonants* when they are ſet before other *Vowels* in the ſame *Syllable*, as in *Juno voluntas*, &c.

The *Mutes* are ſo called, becauſe they begin by their own power, and have the ſound of the *Vowel* after them, of which ſome are pronounced more open and from the *Teeth*, as *T* and *D*; others from the *Palate* as *K* and *Q*; and ſome more cloſe and from the *Lips*, as *B* and *P*. *H* is not properly a Letter, but a Note of Aſpiration before a *Vowel*, only ſometimes amongſt the *Poets* it obtains the power of a *Conſonant*: and it never comes before a *Conſonant*, but always before one of the five *Vowels* and *Y*; as in *Habeo, Habes, Hatus, Horo, Humus, Hydra*, &c.

The *Alphabet* conſiſts of theſe following *Letters*, A, B, C, D, E, F, G, H, I, K, L, M, N, O, P, Q, R S, T, V, W, X, Y, Z; and all theſe *Letters* are written in greater or leſſer *Characters*; and with the greater are generally begun all proper Names, every Sentence after a full Period, and each ſeveral *Verſe* in *Poetry*.

A *Syllable* is that which expreſſeth one entire ſound in a *word*, and conſiſts either of one *Vowel* only, or of *Vowels* joyned one with another, or of *Vowels* and *Conſonants* together, as *Simple*, *Double*, *Triple*, *Quadruple*, and *Quintuple*.

A joyning together of two *Vowels* is called a *Dipthong*, as *æ, ai, ei, œ, oi, eu*, and of three a *Tripthong*; but this is never known in *Latin*, but ſometimes in *French*, as *aou, eau, jau, jeu*.

A *Syllable* is either long, and then it is thus marked ¯; or ſhort, which is thus marked ˘; or Common.

A *Word* conſiſts of one or more Syllables, and admits of *Accent*, *Apoſtrophus*, and *Notation*.

Accent is the harmony of Language, and is otherwiſe called *Tone*, being either Acute, markt thus ´; or Grave or Mean, and marked thus `.

Apoſtrophus is a cutting off of any of the five *Vowels*, eſpecially of the four firſt, as *a, e, i, o*, when the following Word begins with a *Vowel*. This *Apoſtrophus* is ſeldom markt, in the *Latin*, but only intimated by a quick paſſing from one *Vowel* to the other, and that chiefly in *Verſe*.

Notation is that, by which the *Species* or *Figure* of a Word is diſtinguiſhed. The *Species* denotes, whether it be Primitive or Derivative; the *Figure*, whether Simple or Compound.

Of *Words* there are two ſorts, ſome with number, and ſome without Number. A *Word* with Number is that which conſiſts of two Numbers, *Singular* and *Plural*; varying directly or obliquely, and that in *Signification* only, or in *Signification* and *Termination*.

A *Word* of Number is either *Noun*, or *Verb*.

A *Noun* is a Word of Number with Gender, in which beſides the two Numbers, *Singular* and *Plural*, diſtinguiſht from each other by the difference of *Termination*; there is to be conſidered the variety of *Caſes*, which are ſix, *viz.* the *Nominative*, *Genitive*, *Dative*, *Accuſative*, *Vocative*, and *Ablative*; as alſo of *Genders*, to wit

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the *Masculine* belonging to the Male Sex, the *Feminine* to the Female, and the *Neuter* to neither.

From the difference of *Gender*, a *Noun* is called *Substantive* and *Adjective*. The *Substantive* is commonly of one *Gender*, and sometimes of two; but the *Adjective* is of all three Genders. Moreover the *Adjective* admits three *Degrees* of Comparison, *viz. Positive*, *Comparative*, and *Superlative*, and is specially divided into *Article* and *Pronoun*.

The Article *Hic* denotes the *Masculine Gender*, *Hæc* the *Feminine*, and *Hoc* the *Neuter*.

Pronouns are principally divided into *Demonstrative*, as *Ego, Tu, Sui, &c.* into *Relative*, as *Qui, Quæ*; and into *Possessive*, as *Meus, Tuus, Suus*.

The *Declensions* of *Nouns* in Latin are five, and each distinguisht by their several Terminations.

A *Verb* is either *Finite* or *Infinite*. A *Verb Finite* is a Word varied by *Conjugation*, *Mood*, *Tense*, *Number*, and *Person*.

The *Conjugations* are four, differenced by *A, E long, E short*, and *I*.

The *Moods* are three, *Indicative*, *Imperative*, and *Potential*.

Tense, or *Time* in *Verbs*, is generally Threefold, *Present*, *Preterit* or *Past*, and *Future* or *to come*. The *Preterit* is also Threefold, *Imperfect* or *Imperfectly past* (as the Vulgar Introduction to the *Latin Grammar* phraseth it) *Perfect* or *perfectly past*, and *Plusquam perfect*, or more than *Perfectly past*.

Number is common to a *Verb* with a *Noun*, and equally divided into *Singular* and *Plural*.

Each *Number* of the *Verb* consists of three *Persons*, the first speaks of himself, the second speaking to another, and the third also to another: Hereupon a *Verb*, as to its *figure*, is differenced into *Personal* or *Impersonal*.

A *Verb Personal* is that which is formed with all the three Persons throughout all the *Moods* and *Tenses*.

A *Verb Impersonal* runs all along in the Third Person Singular.

A *Verb Personal*, as to its *form*, is divided into *Active*, *Passive*, or *Neuter*.

A *Verb Active* is that which signifies Action, as *Amo, I love*.

A *Verb Passive* is that which signifieth Passion, as *Amor, I am loved*.

A *Verb Neuter* is that which signifieth Being, as *Sum, I am*; *Caleo, I am warm*.

A *Verb Infinitive* hath three *Gerunds*, ending in *Di, Do*, and *Dum*; two *Supines*, the first in *um*, and the latter in *u*; and four *Participles*, two *Active*, and two *Passive*.

A *Word* without *Number* is that which contains in it self no signification of Number, as an *Adverb* and *Conjunction*.

An *Adverb* is a Word without Number, and is of *Quantity* and *Quality*, General or Special.

Quantity Special is in *Number*, *Time*, and *Place*; *Quality*, in *Similitude*, *Affirmation*, *Negation*, *Optation*, *Appellation*, and *Exhortation*.

Moreover under the Word *Adverb* are comprehended *Interjections* and *Præpositions*, which are used either in *Composition*, as *Produco*; or *Appositon*, as *In Urbem*; besides those inseparable *Particles Re* and *Dis*, which being reckoned in the rank of *Præpositions* are never used but in *Composition*, as *Resilio* and *Dispono*.

A *Conjunction* is a Word without Number, by which *Parts* of *Speech* are joyned, and is either *Enunciative* or *Rationative*.

Enunciative is when the Parts are ascertained, being twofold, *viz. Congregative* and *Segregative*.

Congregative is that by which the Parts are signified to be true together, whether *Copulative* or *Connexive*.

Copulative is when the Parts separately are adjusted one with another, as *& etiam, &c. Connexive*, or *Conditional* is when the Consequent is joyned by a Condition of the *Antecedent*, as *si, nisi, &c.*

Segregative is when the *Senses*, as not true together are separated, and is either *Discretive* or *Disjunctive*.

Discretive is, when the Parts are separated upon a Rational Account, as *Although, nevertheless, however, &c. Disjunctive* is, when the Parts are separated by Effect, in such sort as more than one cannot be true, as *Or, otherwise, &c.*

Ratiocinative is, when one of the Parts is concluded by another, to wit, *Rational* or *Causal*. *Rational* is when a Reason proceeds, as *Then, wherefore, &c. Causal*, when a Reason is rendred afterwards, as *For, to the end that, because that, &c.*

Next follows *SYNTAX*, which is the Second Part of *Grammar*, teaching the *Conjunction* or *Association* of Words one with another, as to Concord and mutual Propriety; as of a *Noun* with a *Noun*, in *Number*, *Case* and *Gender*; of a *Noun* with a *Verb Personal*, in *Number* and *Person*; of an *Adverb* and *Præposition*, with the respective Words which they attend upon.

This *Conjunction*, or intercourse of *Words* one with another, is called by *Grammarians*, *Oratio*, or *Speech*, being either Simple or Compound, the Form whereof is either continued or interrupted, which last is called *Dialogue*; and these two manners of *Speech* are indifferently used both in *Prose* and *Verse*.

Finally, A Great part of *Orthography* consists in the right distinguishing of *Sentences*.

The three *Notes* of Distinction generally in use, but received from the *Latins*, are the *Sub-distinction*, the *Middle-distinction*, and the *Plenary* or *Full-distinction*; but known by their *Greek Appellations*, viz. *Comma*, *Colon*, and *Period*.

The *Sub-distinction*, or *Comma*, is only a very short Pause of Respiration or Breathing time; and is expressed by this Note or Mark (,).

The *Middle-distinction*, or *Colon*, is that which stops the *Carier* of a *Sentence* much about the Mid-way, leaving as much of the Sense behind, as hath been already past over, and this is thus Marked (:).

A *Full-distinction*, or *Period*, is that which comes after the perfecting or finishing of a *Sentence*, and is Marked only with one single Prick (.).

To

To these some add a *Semi-Colon*; which indeed is much the same with a *Colon*, or at least but a small diminishment thereof, only differently Marked, as thus (;).

There are also some other Distinctions of *Grammatical* Observations in Sentences, as first, *Interrogation*, or Asking of a *Question*, the Note whereof is thus (?). Secondly, *Admiration*, or making a Wonder at a thing, the Note whereof is thus (!). Thirdly, *Union*, or the Joyning of two *Syllables* together for the making up of a Word, being one of them at the end of a *Line*, and the other at the beginning of the *Line* following; and this is thus Marked (=). Fourthly, *Parenthesis*, which is the intercepting, or intercluding of one *Sentence* with another; the said intercepted *Sentence* being so entire of it self, that it may be wholly taken away, without spoyling or doing any great prejudice to the rest of that which remains.

As to the Curiosity and Elegance of *Language*, it depends not so much upon any Rule or Precept of *Grammar*, as upon the Wit or Floridness of him that Writes or Speaks.

There is apparently in all *Languages*, one and the same reason for the Distinguishing of all expressive words in discourse into several *Classes*, which *Grammarians* call parts of Speech; however we find that every *Language* hath some or other propriety, peculiar to it self; as the *Greek* hath more variety of *Tenses* in the *Verb*, than the *Latin*; also three Numbers both in the *Noun* and *Verb*, *viz. Singular*, *Dual* and *Plural*; so likewise the *Hebrew*, besides the differing Modes of *Regimen* in the *Syntax*; but a *Noun* is a *Noun*, and a *Verb* a *Verb* as well in *Hebrew*, *Caldee*, and *Syriac*, as in *Latin* and *Greek*; the Notion and Idea of them is the same in all Idioms whatsoever. This distinction of parts of Speech is the most Material part, and even the Foundation of *Grammar*; wherefore making the *Latin Tongue* an Exemplar for all the rest, it will not be from the purpose to examine how well our common *Latin Grammarians* acquit themselves, when they divide Speech into eight parts, *viz.* four of them Declinable, as *Noun*, *Pronoun*, *Verb* and *Participle*, and four Indeclinable, as *Adverb*, *Conjunction*, *Preposition*, and *Interjection*. For the first four I will leave to the consideration of any Rational Man, who shall take the pains seriously to consider the matter, whether the four might not very well have been reduced to two, for all the *Pronouns* (except *Ego* and *tu*, which may be accounted each of them a sort of *Hermaphrodite*, part *Substantive*, and part *Adjective*) are palpable *Adjectives* both in their *Nature*, *use*, and *Declination*, as *Meus Liber*, my Book; *Ille Homo*, that Man: And for the *Participle*, whereas there generally proceeds from the *Verb* a numerous Race of *Nouns*, both *Substantive* and *Adjective*, the *Participles* are a more peculiar sort of *Adjectives*, derived from, and depending upon their several *Verbs*. 'Tis true that a *Participle* hath in it something of the Nature of a *Verb*; for it is capable of Governing Cases absolutely in the same manner as the *Verb* it comes from; but in all other respects 'tis perfectly *Adjective*. In like manner it may easily be made out, that in stead of four *Indeclinable parts*, two might well enough serve the turn; for all that the Indeclinable part hath to do, is to wait either on the *Noun*, or *Verb*. That which attends the *Noun* is only single indeed, by the Name of *Preposition*; that whichat tends on the *Verb*, is divided into two Terms, *Conjunction* and *Adverb*. The first leads a Sentence, or couples the Classes of Sentences, and sometimes single words together; the other adds some Circumstance or other to a *Verb*, according as it happens; and for that which is called an *Interjection*, it seems to be no other than a more than ordinary passionate adverbial expression; so that in fine the Indeclinable Particle might in my Opinion be well enough divided into two parts, by whatsoever Term distinguished, namely the Attendant on the *Noun*, and the Attendant on the *Verb*. But since doubtless there hath not been wanting all along something of finess and subtilty of Argument, strong enough to prevail with the common Learner, who takes all things upon trust, in the maintenance of this *Octuple* division of parts, let it pass, since Custom and received Opinion must sometimes obtain in spight of Sense; yet still there will be found remaining some absurdities so gross and rank, that nothing could have suffered them so long uncorrupted, but the easiness of the World to be imposed upon, of which the very principal of all is the raising of seven *Genders* out of *Hic*, *Hæc*, and *Hoc*, as if the *Addition* or *Complication* of any three things could produce a fourth: Nor is the Fallacy much less to make three *Moods* of one, by the Advantage of some *Particle* added, as *Conjunction*, *Adverb*, or the like. By this that hath been said it may be Collected, that more mistakes have been committed in our common, *Grammatical Systems*, than have been observed in the *System* of any other *Art* or *Science* whatsoever. It would be too teedious to make farther Instances, having already insisted upon the most material, but wave them to some other opportunity, and proceed to that part of *Grammar* called *Prosodie*.

PROSODIA.

THere is also belonging to *Grammar* that which is called *Prosodia*, which may also be reckoned an Introduction to *Latin* and *Greek Poesie*, because it directs to the Knowledge and Composition of *Latin* and *Greek Verse*, in order to which it treats first, of the quantity of *Syllables*, Secondly, of the various Denomination of *Feet* in Verse, Thirdly, of the Distinction and Names of Verses, Fourthly, of the various Distinction of *Poems*, and lastly of the Attributes of *Verses*.

Of the Quantity of Syllables.

OF *Syllables* some are long, some short, some doubtful or common, that is, either long or short at pleasure. Long and Short *Syllables* amongst the *Latins* and *Greeks* are known eight several ways. First, By *Position*, that is, when two

Conso-

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Conſonants, viz. a *Mute* and a *Liquid*, or a double *Conſonant* follow a *Vowel*. What *Mutes* and *Liquids* are hath been already treated of. Secondly, By *Diphthong*; a *Diphthong* is long among the *Latins*, except a *Vowel* follow; but among the *Greeks* it varies. Thirdly, By *Preposition*, for the *Prepoſitions a, de, e, di, dis, pro*, and, *ſe*, are Long only in ſome few Exceptions, unleſs a *Vowel* follow. Fourthly, By *Derivation*. *Derivatives* follow generally their *Primitives*. Fifthly, By *Compoſition*, *Compoſites* follow the Rule of their *Simples*. Sixthly, By *Vowel* before a *Vowel*, vvhich in the ſame vvord is for the moſt part Short. Seventhly, By *Rules*, as *Diſſyllable preterperfect Tenſes* are long except *Scidi, Fidi, Tuli, Steti, Dedi*. The Firſt Syllable of a *double preterperfect Tenſe* is ſhort, as in *Momordi, Fefelli, Pependi, Totondi*. The Firſt Syllable of a *Diſſyllable Supine* is Long, as in *Satum, Cretum, Itum, Motum*. The final *Syllable* in *A* of the *Ablative Caſe* Singular of the Firſt *Declenſion*, as *Petrâ*. The final Syllable in *O*, of the *Dative* and *Ablative* Singular of the ſecond Declenſion, as in *Animo*; the final Syllable in *I* of the *Nominative* Plural, as in *Animi*; In *Is* of the *Dative* and *Ablative* Plural of the ſame *Declenſion* as in *Animis*. The final in *As* of the *Accuſative* Plural of the firſt *Declenſion*, as in *Menſas*; of the *Nominative* Singular of acute Creſcents of the third *Declenſion*, as in *Bonitas*. The final *Syllable* in *Es* in moſt words are all Long. The final *Syllable* of words in *B, C, D*, and *T*, are ever ſhort. The final *Syllable* in *Os* of moſt words is ſhort. The final *Syllable* in *Os*, for the moſt part is long. Eigthly, By Examples and Authority of the Antients; thus the firſt and middlemoſt *Syllables* of words are known by the frequent reading, and obſervation of Authors, as *Ma* in *Mater*; *Mu* in *Muſa*; *No* in *Nobis*; *Pa* in *pacis*, *Pu* in *Pudor*, &c. are Long. *A* in *Aqua*, *E* in *Equus*, *Ma* in *Mater*, *O* in *Opus* are Short.

Of the ſeveral Feet in Latin Verſe.

FRom *Syllables* of various *quantity*, various *Feet* ariſe, which are of two ſorts, *viz.* Simple, and thoſe compounded of the Simple: The *Simple Feet* are either *Diſſyllable* or *Triſſyllable*; the *Diſſyllable* a *Spondee*, conſiſting of two long *Syllables*, as Rēgīs; a *Pyrrichius*, conſiſting of two ſhort, as Sūmŭs; a *Trochee*, conſiſting of one long and one ſhort, as ārbŏr; an *Iambus*, conſiſting of one ſhort and one long, as Mĕōs; The *Triſſyllable* are the *Moloſſus*, conſiſting of three long, as Prĕdicō; *Tribrachys*, conſiſting of three ſhort, as ănĭmŭs; a *Dactyl*, conſiſting of one long and two ſhort, as Cārmĭnă; an *Anapæſtus*, conſiſting of two ſhort and one long, as Dŏmĭnī; *Bacchius*, conſiſting of one ſhort and two long, as Quĕrēlă; *Antibachius*, conſiſting of two long and one ſhort, as Mŏrtālĕ; *Amphibrachys*, conſiſting of one long in the middle and two ſhort, *viz.* the beginning and end, as Prŏtĕrvŭs; *Amphimacbrus*, conſiſting of one ſhort in the middle, and two long at the beginning and end, as Virginēs. The *Double* or *Compound Feet* are *Diſpondees*, conſiſting of two *Spondees*, as Cōntŭrbābānt; *Proceleuſmaticus*, conſiſting of two *Pyrrhichius's*, as Mĭſĕrēŭs; *Diiambus*, conſiſting of two *Iambuus's*, as Mĭnŏrĭtās; *Ditrochæus*, conſiſting of two *Trochees*, as Trānsĭĕrĕ; *Antiſpaſtus*, conſiſting of an *Iambick* and a *Trochee*, as Rĕpēntĭnūs; *Choriambus*, conſiſting of a *Trochee* and an *Iambes*, as Sōlĭcĭtī; *Ionicus Minor*, conſiſting of a *Pyrrichius* and *Spondee*, as Prōpĕrāntēs; *Ionicus Major*, conſiſting of *Spondee* and *Pyrrichius*, as Clārĭſĭmūs; *Pean* firſt conſiſting of *Trochee* and *Pyrrichius*, as Sūſtĭnĕō; *Pean* ſecond, conſiſting of *Iambus* and *Pyrrichius*, as ĭmāgĭnĕ; *Pean* third, conſiſting of *Pyrrichius* and *Trochee*, as ănĭmātūs; *Pean* fourth, conſiſt- of *Pyrrichius* and *Iambus*, as Rĕgĕmĭnāns. Theſe *Feet* are common to *Greek* and *Latin* Verſe.

Of the diſtinction and denomination of the ſeveral ſorts of Latin Verſe.

LAtin *Verſes* are variouſly denominated, either from the ſort of *Feet* of which they are compoſed, from the *Inventor*, or from the kind of *Poem*, to which they are moſt proper, and in which they are moſt uſed, and ſometimes from the Number of *Feet* or *Syllables* whereof they conſiſt, as *Iambick* or *Trochaick* Verſes, from the *Iambick's* or *Trochees* of which they are compoſed: *Sapphic* from *Sappho*, the firſt Inventreſs of that kind of *Verſe*; *Pindaric* from *Pindarus*; *Heroic* and *Elegiac* from *Poems* of that nature; *Hexameter* and *Pentameter*, from the number of the *Feet*, the firſt ſix, the other five; *Hendecaſyllable*, from the number of *Syllables*, viz. Eleven.

The moſt uſual ſorts of *Latin* Verſes, are theſe that follow, The *Hexameter*, the *Pentameter*, *Iambic*, *Sapphick*, *Adonic*, *Phaleucian* and *Aſclepiadean*.

The *Hexameter* is compoſed of ſix Feet, *Dactyl* and *Spondee*, only variouſly diſpoſed at pleaſure; but in the fifth place of a *Dactyl*, and in the ſixth a *Spondee*, as *Virgil*;

Incipe Mænalios mecum mea Tibia Verſus.

Yet not always, for ſometimes though, very rarely, a *Spondee* is found in the fifth place; as in *Ovid*.

Hanc decet ornari, teſtudine Cyllenea.

This kind of *Verſe* is alſo called *Heroic*, as being commonly uſed in *Poems* of a *Heroic* Subject.

The *Pentameter* is ſo called, as conſiſting of five Feet, reckoning the two long *Syllables* in the middle and end, which put together, make a *Spondee* according to the common way of Scanning, as thus; In the firſt place a *Spondee*, in the ſecond a *Dactyl*, ſometimes a *Spondee*, or in the firſt place a *Dactyl*, and in the ſecond a *Spondee*, then a long *Syllable*, in the third and fourth place *Dactyls*, and at the end a long *Syllable*; but in my mind it may be ſcan'd, in a more facil and proper manner, with four *Moloſſus Feet*, thus; In the firſt place a *Spondee*, in the ſecond a *Choriambus*, ſometimes *Moloſſus*:

Or in the firſt place a *Dactyl*, in the ſecond a *Moloſſus*, in the third a *Dactyl*, and in the laſt a *Choriambus*. An Example of the firſt is this following, in *Ovid*.

Nond ſigna dabunt exoriente Lyra.

Of the ſecond, which is far more frequent in this,

Vulgus amicitias Utilitate probat.

This ſort of Verſe is ſeldom or never uſed alone, but ſtill following an *Hexameter*; as,

Ex ego non paucis quondam munitus amicis,
Dic flavit velis aura ſecunda meis.
Fera nimboſo tumuerunt æquora vento,
In mediis lacera nave relinquor aquis.

The *Iambic*, ſo called from the *Iambic* Foot, of which it chiefly conſiſts, is the moſt various of all other ſorts of *Verſe*, being either *Diameter*, *Trimeter*, or *Senarie*; but the moſt uſual of all is the *Senarie Iambic*, conſiſting moſt of *Iambic* Feet, but now and then a *Spondee*, or a *Trochee*: The moſt Genuine is only compoſed of *Iambic Feet*; as,

Suis & ipſa Roma viribus ruit.

Diameter is ſeldom uſed, but with other Verſes; but the *Trimeter* is a ſtately ſort of *Iambic*; as,

O carminum dulces notæ,
Quas ore pulchra melleo
Fundis Lyræque ſuccinis.

The *Sapphic*, ſo called from the *Greek* Poetreſs *Sappho*, who firſt invented and uſed it, conſiſts of five Feet, a *Spondee* in the firſt and ſecond place, a *Dactyl* in the third, a *Trochee* in the fourth and fifth; as,

Nullus argento dolor eſt avaris.

The *Adonic* is a Verſe conſiſting only of *Dactyl* and *Spondee*, and is ſeldom or never uſed but with *Sapphics*, that is, after every third Verſe; as,

Jam ſatis———
Grandinis miſit pater, & rubente
Dextera ſacras jaculatus arces,
Terruit urbem.

The *Phaleucian* conſiſts as the *Sapphic* doth of five Feet, made up of eleven *Syllables*, and therefore is called as the *Sapphic*, alſo might be *Hendecaſyllabum*; the Feet of the *Phaleucian* are in the firſt place a *Spondee*, in the ſecond a *Dactyl*, in the third, fourth and fifth a *Trochee*; as,

Paſſer deliciæ meæ puellæ.

The *Aſclepiadean* conſiſts of four Feet, a *Spondee*, a *Choriambus*, and two *Dactyls*; as,

Sublimi feriam Sydera vertice.

This ſort of Verſe and the *Sapphic* are very much uſed by *Horace* in his *Odes*, as the *Phaleucian* by *Catullus*.

Of the various diviſion of Poems.

POEMS are divided into manifold kinds; but the moſt general diviſion of them is threefold, *viz.* into *Dramatic*, *Examatic*, and Mixt.

Dramatic Poems are ſo called from the repreſentation of things acted or done, and are chiefly of two ſorts, *Tragedy* and *Comedy*; the laſt treats of mean and vulgar Actions, the firſt of more high and noble.

Exegematic Poems are thoſe which are carried on by the Author in one entire contexture, without any interpoſition of Perſons.

Mixt are thoſe wherein ſometimes the Author ſpeaks, ſometimes other Perſons are brought in ſpeaking.

Of the Attributes of Verſes.

THe *Attributes* of *Verſes* are chiefly four, *Scanſion*, *Cæſura*, *Figura*, and *Permiſſio*.

Scanſion is the meaſuring and adjuſting of a Verſe by its Feet.

Cæſura is the making of a ſhort *Syllable* long at the end of two or three Feet, the firſt is called *Pentimemeris*; as,

Pectoribus inhians, ſpirantia conſulit exta.

The other *Heptimemeris*.

The *Figures* are uſually the ſame as in Proſe, and are particularly treated of in Syſtems of *Rhetorick*.

Mixtion is the compoſition of ſeveral kinds of *Verſes* in the ſame *Poem*. The firſt *Mixtion* is called *Dicolon diſtrophon*; that is, of *Hexameter* and *Pentameter* together, as hath been noted in the deſcription of thoſe kind of Verſes. The next is *Dicolon Tetaſtrophon*; that is, when after three Verſes of the ſame kind a fourth of another kind follows, as in the *Sapphic* and *Adonic* before noted: The laſt is *Tricolor Tetraſtophon*; that is, when after four Verſes of three kinds a return is made to the ſame again; as,

Dianam teneræ dicite Virgines,
Intonſum pueri dicite Cinthium,
Latonamque Supremo
Dilectam peritus Jovi.
Vos lætam fluviis & memorum coma,
Quæcunque aut gelido prominet algido.
Nigris aut Erymanthi,
Sylvis aut viridis cragi.

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RHETORICK.

RHETORICK is the Art of well speaking, or Elegantly discoursing, being according to the *Eliptical Table*, divided into two parts, *Elocution* and *Pronuntiation*; To which 'tis thought not improper to præfix *Invention* and *Disposition*, as being handled in several accurate Systems of *Rhetorick*; and therefore not wholly to be omitted here, before we proceed to the two parts mentioned in the said *Table*.

Invention is the Contriving, or bringing of matter together, for the Composing of any *Argument*, *Discourse*, or *Oration*. The *Topicks* or *Heads* whence Arguments may be invented are these following, First, *Definition* or a Speech declaring what a thing is. Secondly, *Division* or the Distribution of the matter propounded into its parts. Thirdly, *Notation* or *Etymology*, which is the interpretation of a word, shewing both its Original and Signification. Fourthly, *Conjugation*, which shews either the various endings of words, or the derivation of several words from one Primitive. Fifthly, *Genus* is that which comprehends several things under it. Sixthly, *Species*, any of those things that may be restored to their common *Genus*. Seventhly, *Similitude*, or the comparing of two or more things together. Eighthly, *Dissimilitude*, or the disagreeing of two or more things in some particular. Ninthly, *Contraries*, or things which cannot both at the same time agree, with one and the same thing. Tenthly, *Opposites* or things that can never agree. Eleventhly, *Comparison*, or the comparing of one thing with another. Twelfthly, *Causes*, that is, such things by which any thing is in any sort produc't, being Fourfold, *Efficient*, *Material*, *Formal*, and *Final*. Thirteenthly, *Effects*, that is, things propounded by their Causes. Fourteenthly, *Adjuncts*, or Things that are joyned to the thing, or person propounded. Fifteenthly, *Antecedents*, or things which go before the thing or matter. Sixteenthly, *Consequents*, that is, things which do necessarily follow after the thing or matter.

Disposition is the orderly placing of those things which are Invented; hence results *Discourses* or an *Oration*, the parts whereof are commonly reckoned these five; First, *Exordium*, by which the *Orator* doth prepare the minds of the *Auditors* for that which is to follow, by bespeaking their favours, by making them docible, or by beging their Attention. Secondly, *Proposition*, in which the *Orator* doth briefly deliver the Sum of the whole matter of which he intends to speak. Thirdly, *Narration*, in which a relation is made of the matter or thing done. Fourthly, *Confirmation*, in which Arguments are brought to prove the *Proposition*, and if need be, to contrary the Opinion of any Oppofer. Fifthly, *Peroration* or *Conclusion*, in which the *Orator* useth such *Figures* as are most proper to move the Affections of the *Auditors*.

Elocution is no other than the Ornament and Enrichment of Speech, which is also Twofold, *viz. Trope* and *Figure*.

Trope is a part of *Elocution*, by which the Natural or proper Signification of a word is changed into another. There are two sorts of *Trope*, at least a double Modification thereof; *viz.* simple as *Metonymie* and *Ironie*, and compound as *Metaphor* in respect of a comparison, and *Synecdoche* in respect of *Distribution*. If a *Trope* be a little harsh, or far fetch't, it may be called *Catachresis*, or *Abusion*; which if it be somewhat too ruff to the *Ear*, it may be sweetned and softned by such like excuses, as the Latins call *Præmonitions*. If the Signification be raised, or carried on to any excess, it is called *Hyperbole*; If any ways multiplied and continued, an *Allegorie*.

Metonymie is a *Trope*, by which a word first design'd to signifie properly the cause of any thing whatsoever is made use of to signifie the effect, where that which is properly used for the Subject, is transfer'd from its proper and natural Signification, to signifie a Circumstance, or contrariety, where words design'd to signifie Effects or Circumstances are converted to signifie *Causes* and *Subjects*

He reads *Ovids* works, that is a *Metonymie* of the efficient cause for the Effect.

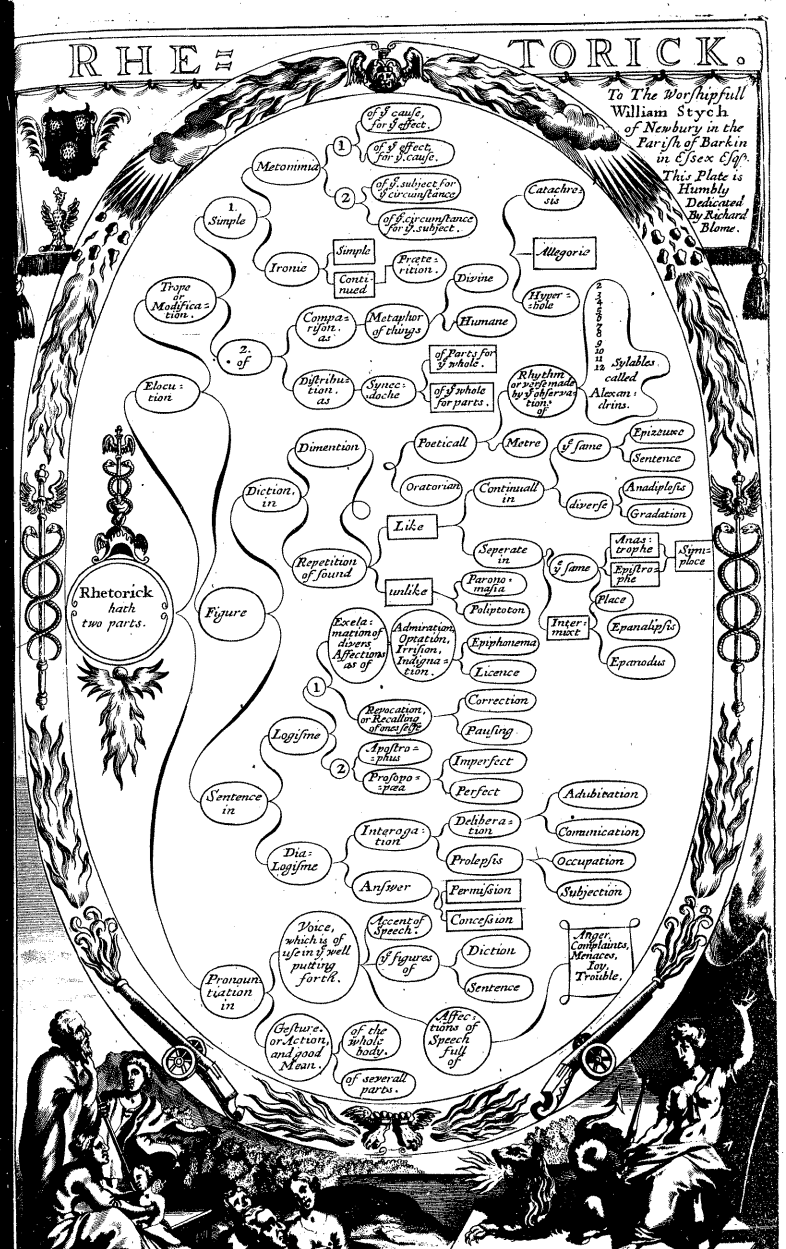
Mans life prolong'd, must yield to crooked Age, that is, Age which maketh crooked; this is a *Metonymie* of the Effect, for the *Efficient Cause*.

My Friend I see hath got a chirping Cup; that is, as much Wine or strong Drink as a large Cup will contain; this is a *Metonymie* of the *Subject* for the *Adjunct*.

I yield much reverence to your hoary Hairs; that is, you who have *hoary Hairs*; this is a *Metonymie* of the *Adjunct* for the *Subject*.

Ironie is when one contrary is understood by another, that is to say, when any word is made use of in a Signification, contrary to what it ought to be; and therefore may otherwise be called *Simulation*, or *Dissimulation*.

You are a Man of your word indeed; that is, *a Faith-breaker*. It is simple or continued, and hereunto may be referred *Preterition*, as a Species of Dissimulation; that is, when we make semblance of not being willing, to say that which ne-



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nevertheleſs we at laſt do utter, as

He was a wary Man, I might ſay covetous.

Metaphor is, when one like is underſtood by another, that is, when one word of a proper Signification is made uſe of for another like it. It may otherwiſe be called *Tranſlation*, which is as Comprehenſive as *Similitude*; for there is nothing in Nature whoſe Name and Appellation may not be applied to ſome thing elſe.

When Spring appears the very Heavens ſmile; that is, *look pleaſantly.*

Synecdoche, which we call *Conception*, and *Intelligence* is, when a part is taken for the whole; or on the contrary, the whole for a part.

His happy Reign full forty Summers laſt'd; that is, *forty Years.* This is *Synecdoche partis.*

A *Figure* is another part of *Elocution*, by which the Phraſe of *Language* is advanc't from the ſimple and vulgar manner of ſpeaking; for as of words ſome are proper, ſome Tranſlate; ſo in *Language*, and manner of *Speech*, one ſort is ſimple and vulgar, another *Figurative*, that is to ſay, a little changed or altered from the common and Familiar way.

There are two ſorts of *Rhetorical Figure*, one of *Diction*, and the other of *Sentence.*

Figure of *Diction* is that which renders *Language* ſweet and harmonious, by a reſonancy of words called number, which affects the *Ear*, with a certain delight, being a kind of pleaſant *Modulation* and Harmony of Speech made by a certain meaſure and quantity of *Syllables* made therein, or by a pleaſing Repetition of words of the like ſound.

The Obſervation of *Syllables* in Speech, is altogether *Poetical*; and is either *Rhythm*, or *Meetre*; *Rhythm* is made by the Obſervation of the ultimate *Syllables* of one, two, three, or four, or more *Verſes* anſwering to each other in ſound: But *Meetre* or *Verſe* is the Obſervation of *Feet*, conſiſting of two, three, or more *Syllables*, according to their long or ſhort.

The *Repetition* of *Sound* is agreeable, as well to *Proſe* as *Verſe*, and may indifferently be uſed by *Orator* and *Poet* at pleaſure. This *Repetition* is either of the like ſound; and that continually in the ſame Sentence, as *Epizeuxis*; or in divers Sentences, as *Anadiploſis* and *Gradation*; or ſeparately, and that either in a ſucceſſive order, as *Anaphora*, *Epiſtrophe*, and *Symploce*; or promiſcuouſly as *Epanaliphis* and *Epanodos*; or of an unlike ſound, as *Paronomaſia*, and *Poliptote.*

Epizeuxis is a Rhetorical Number, in which one and the ſame ſound is ſubſequently repeated.

Time flies, Time flies, never to be recalled.

Anadiploſis is the ſame ending of one Sentence, as the beginning of the following.

If why I take not leave ſhe ask, ask her again, &c.

Gradation is the carrying on of any expreſſion, from a lower to a higher Degree.

Deſert begat Admiration, Admiration Eſteem, Eſteem procured love it ſelf.

Anaphora or *Relation*, is the Repetition of one and the ſame ſound, at the beginning of ſeveral *Sentences*, or *Members* of a Sentence.

By Art of Sails, &c. Seas are divided.

By Art the Chariot runs, by Art Loves guided.

Epiſtrophe or Converſion, is the contrary of *Anaphora*, that is, a Repetition of the ſame ſound, at the end of ſeveral *Sentences*, or *Members* of a Sentence.

What braver People than the Romans; *who more Renowned in Arms than the* Romans: *More Flouriſhing in Arts and Eloquence than the* Romans?

Anaphora and *Epiſtrophe* joyned together, produce the Figure *Symploce* or *Complication.*

The more he ſtrive to bring his end about, the more he failed to bring his ends about.

Epandleſis is a Repetition of the ſame ſound, both at the beginning and end of *Sentences.*

Great was his Actions, as his Fame was Great.

Epanodos or *Regreſſion* is as it were a Reflexion of the like ſound, at the beginning and middle, or at the middle and end of a *Sentence.*

The Prince deſired above all things to oblige the People.

The People feared nothing more than to diſpleaſe the Prince.

Paronomaſia or *Agnominatio*, is an Alluſion or Reſemblance of one word to another; and it is either of a whole word, or of a part thereof: *Paronomaſia* of a whole word is called *Equivocal*, and ſometimes is the ſame thing with *Rythm* of a Verſe: *Paronomaſia* of a part of a word is in certain *Syllables*; for ſometimes words reſemble one another in the firſt and laſt *Syllables*, ſometimes in the middleſt and laſt *Syllables.*

Polyptoton is comprehended under *Agnominatio*, and is vulgarly called Traduction, by which oft times the laſt caſe is changed, yet there remains ſome Similitude betwixt the words.

Swords Claſh with Swords, and Shields againſt Shields do hit.

Figure of *Sentence* is a *Rhetorical Figure*, extended and continued through a whole Sentence: It conſiſts either in *Logiſm*, or *Dialogiſm*; *Logiſm* is when a Sentence is Figured without *Collocution*, or *Interchange* of Diſcourſe; and of this there are ſeveral kinds, as Firſt *Exclamation* and *Revocation*; and Secondly by *Apoſtrophe* and *Proſopopœa. Exclamation* is an Elevation of the Voice, for the better heightning and amplifying of what is expreſt, and conſiſts of ſeveral *Affections*, as *Admiration*, *Optation*, *Deriſion*, *Indignation*, *Salutation*, &c. To which may alſo be referred *Epiphonema* and *Licentia.*

Epiphonema is a kind of *Exclamation*, which comes in voluntarily at the end of the Narration of any thing.

Such horrid things Ambition brings to paſs.

Licence is a *Figure* which pretends a kind of boldneſs, in ſpeaking that which ſeemed to have been deſigned to be concealed.

Revocation is a calling back upon mature Deliberation, of ſomething that was ſpoken in heat and vehemence in the foregoing Sentence. To this Figure belongs *Correction* and *Reticence.*

Epanorthoſis or *Correction*, is a Bridling, or checking of our Speech, the grace whereof conſiſts

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fists in the ingenious, and subtile calling in of what was before spoken. As,

Dy'd did I say, alas he did not dye.

Aposiopesis or *Reticence* is the shorning, or Retrenching of a Sentence by abruptly breaking off in the midst of something that seems designed to have been said.

Many such Injuries have I received; But if I live.

Apostrophus or *Aversion* is a Diversion, or turning away of ones Speech, or intended Address from one thing or Person to another.

Be Witness O ye Heavens.

Prosopopœa or *Sermocination* is a Figure of Sentence, by which on a suddain one turns from his former manner of Speech, and speaks in the person of another; and it is either imperfect, or perfect. *Prosopopœa* is called imperfect, when the fiction of another Person speaking is only intimated, that is by recounting, or rehearsing what such or such a one hath said. As,

I am, said he, of Noble Parentage.

Perfect and plain *Prosopopœa* is an absolute representing of another Person, by our manner of *Speech.*

Jove *me begat, things both to come and past, and also present are by me reveal'd.*

Dialogismus is either in *Interrogation*, or *Answer.*

Interrogation consists in Deliberation and Occupation. *Deliberation* or *Consultation* consists in *Addubitation* and *Communication.*

Addubitation expresseth the Affection of a Man, in Doubt and Perplexity. As

What shall I do, or whither shall I fly?

Communication is a *Deliberation* and *Consultation* with others, as in the following Figure with our selves.

Prolepsis is a Figure of Sentence, by which we readily answer, as it were to a demand or Objection before it is made: It is sometimes called *Occupation*, and sometimes *Subjection.*

Answer is in *Permission* and *Concession.*

Permission is when we give leave and power to do any thing. As,

Follow your own desires, I envy not.

Concession seems to be an Approbation of a thing proposed in such sort, that as *Permission* is in *deeds*, so *Concession* is in *words* and *arguments*: As when we grant that which he who disputes against us, demands to have granted.

But we will grant that all you have said is true.

Pronunciation is another part of *Rhetorick*, which expresseth *Elocution*, and utters in Speech what was first conceived in the mind; and consists of two parts, *Voice* and *Gesture.* Whereof the first presents it self to the *Ear*, and the second to the *Sight*: By which two *Senses* all Knowledge is apprehended.

Vocal Pronunciation consists much in the goodness of the *Voice*, which is a principal thing to be desired, for the uttering and putting forth of *Accent*, and *Tone* of *Speech*, all which Figures of *Diction* and *Sentence*, and all the *Affections* and *Passions* of the Mind, so that the utterance may be agreeable to the Subject spoken of.

Gesture consists in Action, and the handsom disposition of the Body, and all its parts.

LOGICK.

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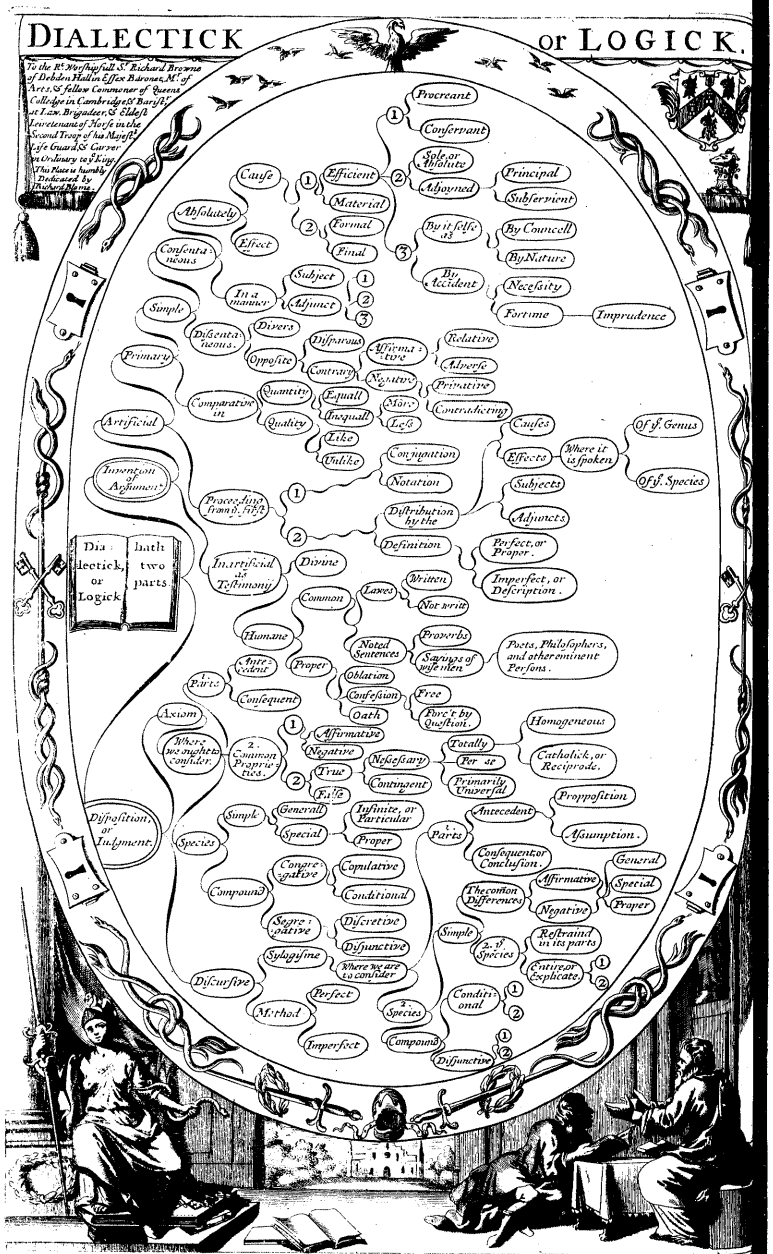

LOGICK.

Dialect or *Logick* is an *Art* of well disputing or reasoning; and consists of Two parts, *Invention* and *Judgment*. Invention is the first part, and serves for the raising up of *Reasons* and *Arguments*.

Argument is that which is designed for the better declaring of any thing that is to be discourst of, and is either *artificial* or *inartificial*.

Artificial takes upon it to make out it self and its own nature, and is either *Primary*, or proceeding from the *Primary*.

The *Primary* is either simple or compared: The simple is *Consentaneous* or *Dissentaneous*. The Consentaneous consents with the thing which it argues and declares, and is of four kinds, *Cause*, *Effect*, *Subject*, and *Adjunct*.

Cause is an Argument whence proceeds some Effect, and is also of four kinds, *Efficient*, *Material*, *Formal*, and *Final*.

Efficient is the cause by which any thing is effected, and hath a three-fold division, *viz.* First; It is either *Procreant*, or *Conservant*. *Procreant* is that which first effects any thing, and *Conservant* is that which maintains it in its first State.

Secondly, The *Efficient cause* is either sole, or joyned with another. The sole is that which doth a thing by its own efficiency or power. The Efficient joyned with another, is either Principal or Subservient, and assisting to the Principal.

Thirdly, The *Efficient cause* is either of it self, or by accident; the Efficient *per se*, or of it self, as that which acts by its own proper motion, as by *Councel*, by *Nature*, &c. The *Efficient* by Accident, is that which acts by an external motion, as Necessity, which is a force upon the Effect: *Fortune* is also a cause by accident, acting without constraint upon its Effect.

Matter is a cause of which a thing is made.

Form is that by which any thing is what it is, and by which it is different from all other things.

The *final cause* is that from which any thing is made or done.

The *Effect* is whatsoever issueth or proceeds from the causes: The *Subject* is that to which any thing is adjoyn'd: The *Adjunct* is that which is joyned to the subject.

Dissentaneous is an Argument which dissents and contradicts the thing which is argued or declared, and is either *Diverse* or *Opposite*; *Diverse* is that which contradicts by reason alone; *Opposite* dissents both in reason and fact. *Opposite* is either *Disparous* or *Contrary*; *Disparous* is an Opposite not differing very much as to Singulars, that is to say, one from one, but plurally, or one from many. *Contrary* is where one is absolutely opposed to one, and is either Affirmative or Negative. The *Affirmative* is either *Relative* or *Adverse*. *Relative* is a contrary Affirmative, whose essence is mutual; Adverse is a contrary Affirmative whose *essence* is separate. A contrary Negative is where one thing contains a negation of the other, and is either *Privative*, or *Contradicting*; *Privative* is a contrary Negative, where one is the Habitude, the other the privation of the Habitude; The *Contradicton* is the Contrary *Negative*, where one affirms, the other totally denies the same.

Comparate is where one thing is compared with another, and is of two kinds, one in Quantity, and the other in Quality.

The Comparison of Quantity is by *Mathematicians* called *Ratio*, or *Proportion*; and it is either equal, or unequal; equal Proportions are those whereof there is one and the same quantity; unequal are those whose quantities are unequal, and are either more or less unequal: the more unequal is that whose quantity exceeds, the less whose quantity comes short.

Comparison of *Quantity* is that by which things are said to be so, and so that is to say, like or unlike. Like are those whereof there is one and the same quantity; unlike are those whose quantities are diverse or different.

Arguments proceeding from the primary are *Conjugation*, *Notation*, *Distribution*, and *Definition*; *Conjugation* is the various mutation of *Nouns* by their diversity of Cases,

Notation is the Interpretation of a *Nounn*, or name. *Distribution* is a distinction of the whole into parts, that is, by the *Causes*, *Effects*, *Subjects*, or *Adjuncts*: Of the second kind of distribution by Effects, is the distribution of the *Genus* into its Species, which is properly called *Division*: *Genus* is the whole of several things alike in Essence or alike Essence of many things: *Species* is a part of the *Genus*.

Definition is that which properly declares what any thing is, and it is either Imperfect, or Perfect: That is properly called *Definition*, this *Description*; perfect *Definition* is a Definition composed of Causes constituting the Essence.

Description is a description composed also of other *Arguments*.

Inartificial Argument is that which by it self and by its own force creates no belief but as it borrows its force of some Artificial Argument: This *Argument* is commonly called *Authority*, or *Testimony*, and is either Divine, or Humane; *Divine* as the Oracles of God; or *Prophesies*; *Humane* is common, or proper; Common as the written, or unwritten Law, famous Sentences, *Proverbs* or

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Sayings of wise *Poets*, *Philosophers*, and other renounced Persons Testimony proper, as *Obligation*, *Confession*, *Question*, and *Oath*.

Judgment is the second part of *Logick*, and treats how to dispose arguments to judge by a certain Rule of disposition; whence this part is called by one and the same signification *Judgment* and *Disposition*: *Judgment* is either without *Discourse*, as an *Axiom*, or *Discursive* as a *Sylogism* and *Method*.

An *Axiom* is the disposition of one Argument with another, by which it may be judged whether a thing be or not; where we ought to consider first the parts Antecedent and Consequent; Secondly the common *Affections*, and *Proprieties* of *Affirmation* and *Negation*, of Truth or Falsity; and Thirdly the *Species* Simple or compound.

An *Axiom* is affirmed if the Copulative be affirmed, and contrarywise denied if that be denied; Also an *Axiom* is true when it is pronounced really as the thing is; and false when on the contrary: A true *Axiom* is either necessary or contingent; A necessary *Axiom* is always true and can never be false: An Impossibility on the contrary cannot be true. Moreover it is either *Homogeneous*, that is, when the parts are *Essential* amongst themselves; or *Reciprocal*, that is, when the Consequent is affirmed, and verifyed of its Antecedent, nor only totally, and of it self, but also reciprocally.

An *Axiom* is either simple, or compound: An *Axiom* simple is comprised under one word, so as from thence to make any *Affirmation* or *Negation*: An *Axiom* simple is *General*, *Particular*, or *Proper*.

General is when a common Consequent is generally attributed to a common *Antecedent*.

Particular is when a common Consequent is particularly attributed to the *Antecedent*.

Proper is when the Consequent is Attributed to its *Proper Antecedent*.

A Compound *Axiom* hath many Sentences conjoyned, of which the *Copula* is not a *Verb* but *Conjunction*: This compound *Axiom* is in respect of its Conjunction, either *Congregative*, or *Segregative*; the *Congregative* being either *Copulative* or *Conditional*; the *Segregative* either *Discretive* or *Disjunctive*.

An *Axiom Copulative* is a compound *Axiom* whose *Copula* is a Conjunction *Copulative*; An *Axiom* conditional is that whose *Copula* is a *Conjunction Conditional*; An *Axiom Discretive* is that whose *Conjunction* is *Discretive*. A *Disjunctive* is that whose *Conjunction* is *Disjunctive*, and so in all others of the like nature.

Judgment Discursive is when one *Axiom* is drawn from another, and is either *Sylogism*, or *Method*.

A *Sylogism* is a Discursive *Judgment* by which a *Question* is so disposed with the *Argument* that the *Antecedent* being granted the Conclusion must necessarily follow. Of a *Sylogism* we are first to consider the *Parts*, next the several *Kinds*.

The *Antecedent* of a *Sylogism* hath two parts, *Proposition* and *Assumption*; but the Consequent is that which contains the parts of the *Question*, and there concludes, whence it is the *Complexion*, or the *Conclusion*.

The *Proposition* is that by which the Consequent of the *Question* is disposed with the *Argument*. The *Assumption* is drawn from the *Proposition*; The *Conclusion* comprizeth the parts of the *Question* which it concludes.

A *Sylogism* is of two kinds, Simple and Compound; the Simple is when the Consequent part of the *Question* is put in the *Proposition*, the *Argument* in the *Assumption*: And it is *Affirmative* when its parts are affirmed; *Negative* when one of the *Antecedent* parts together with the Conclusion is denyed; It is also *General*, that is, when the *Proposition* and the *Assumption* are General. Special when one of the two only are General; *Proper* when both of the parts are *Proper*.

A *Simple Sylogism* is either restrained in its parts, or entire; A *Sylogism* restrain'd is when the *Argument* is so adjusted to a particular *Question*, that preceding one or the other part, and being Affirmed of the *Assumption* it is so much the better understood.

A *Sylogism* entire is when the *Proposition* is General or Proper, and the Conclusion like to the *Antecedent*, or the weaker part. Of this there are two kinds; in the first the *Argument* is always Consequent, and concludes only the Question denied; and it is first General, second General, and first and second Special.

The second kind of *Sylogism* entire is when the *Argument* is the *Antecedent* of the *Proposition*, the Consequent the Affirmative of the *Assumption*; and it is *Affirmative* General, *Negative* General, *Affirmative* Special, *Negative* Special, *Affirmative* Proper, and *Negative* Proper.

A *Compound Sylogism* is when all the *Question* is one of the parts of the *Proposition* affirmed and compounded, and the *Argument* is the other part. This *Compound Sylogism* is either *Conditional*, or *Disjunctive*.

The *Conditional Sylogism* is that whereof the *Proposition* is conditional, and it is of two kinds; The first kind takes back the *Antecedent*, and concludes the Consequent: the second takes back the Contradiction of the Consequent, and concludes the Contradiction of the *Antecedent*.

A *Disjunctive Sylogism*, is a Compound *Sylogism* whose *Proposition* is *Disjunctive*, as also its kinds; The first *Disjunctive* kind takes back the contradiction of the one and concludes the contradiction of the other.

Method is a *Judgment* discursive of divers *Homogeneous Axioms* which are proposed to be wholly absolutely preceding nature, more evident, more clear and notorious.

Method is twofold, the *Method* of *Doctrine*, and the Method of *Prudence*.

The *Method* of *Doctrine* is an artificial and perfect Method taken and deduced from general *Propositions* more clear and notorious than nature to those that are short in the knowledge thereof.

Method of *Prudence* is a *Natural*, inartificial and imperfect Method; so called because it can hardly be Governed by any certain *Art*, but is almost totally managed by the Prudence and Judgment of Man.

THEO-

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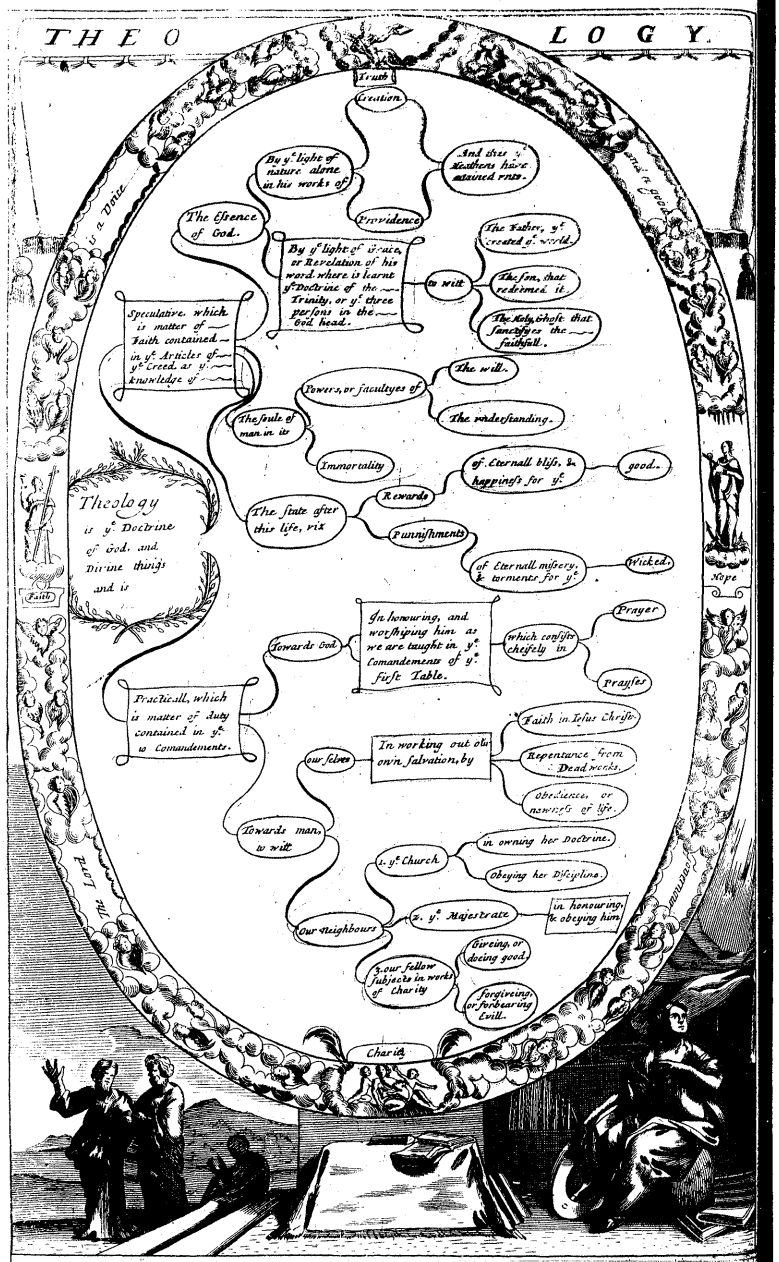
THEO LOGY.
Truth
Creation.
By y^e light of nature alone in his works of
And thus y^e Heathens have attained unto.
Providence
The Essence of God.
By ye light of grace, or Revelation of his word where is learnt ye Doctrine of the Trinity, or ye three persons in the God head.
to wit
The Father, ye created ye world.
The Son, that redeemed it
The Holy Ghost that sanctifyes the faithfull.
Speculative, which is matter of Faith contained in ye Articles of ye Creed, as ye knowledge of
Powers, or faculteyes of
The will.
The understanding.
The soule of man in it
Immortality
Theology is ye Doctrine of God, and Divine things and is
The state after this life, viz
Rewards
of Eternall blis. & happiness for y^e
good.
Punishments
of Eternall misery, & torments for y^e
Wicked.
Faith
Hope
In honouring, and worshiping him as we are taught in ye Comandements of ye first Table.
which consists chefely in
Prayer
Praises
Towards God
Practicall, which is matter of duty contained in ye 10 Comandements.
In working out our own salvation, by
Faith in Jesus Christ.
Repentance from Dead works.
Obedience or newness of life.
our selves
Towards man, in will
in owning her Doctrine.
ye Church.
obeying her Discipline.
ye Majestrate
in honouring, & obeying him.
our Neighbours
Giveing, or doeing good.
our fellow subjects in works of Charity
forgiveing, or forbearing Evil.
Charity
The Love

THEOLOGY.

THEOLOGY is the Doctrine of the knowledge of God and Divine things, in order to his glory, and the eternal Salvation of the Soul of Man.

I have endeavored in the precedent *Scheme* or *Table* to make use of such a Method or short *Body of Divinity* as might be plain and easy, and yet comprehend that which is necessary.

For this reason I have divided it into its *Speculative* and *practic part*, that is, into *Knowledge* and *Practice*.

The Knowledge is of what we are to believe and understand, and the Practice of what we are to do to obtain Everlasting Life.

The former of these is contained in the several *Symbols* of the *Creed*; the latter in the *Decalogus* or *Ten Commandments*, which both together are, as it were an *Epitome*, or *Synopsis* of whatever is contained in the *Holy Scriptures*, necessary to *Salvation*.

This Divine Speculation consists principally in a right knowledge and belief of these Three things, to wit, the Knowledge,

1. *Of the Essence of God.*
2. *Of the Faculties, and Immortality of the Soul.*
3. *Of the State after this Life.*

And these three are all taught us in the *Apostles Creed*.

The knowledge of *Gods Essence* or Nature, may in regard of the Degrees and manner of attaining it, be said to be Two-fold, that is, either what may be seen and perceived by the Light of Nature, or what we have by Divine *Revelation*.

That which we have by the Light of Nature is from the consideration of his Works, both of *Creation* and *Providence*.

God Almighty is easily perceived in his Works of Creation, whether we look upon the great, or the little World; I mean, whether we consider the *Structure*, *Beauty*, and *Symmetry* of the *Universe*, or the Frame and Constitution of our own Selves. When we look upon this vast and Glorious Fabrick of the *World*, the beauty and Variety of the *Creatures*, the constant order of their Dissolution, and re-production, their wonderful Harmony in the mutual support and Preservation of one another, we cannot chuse but imagin that all this is the Product of some Higher Power, than any we met with in the World, and this is the first Notion of *God*.

Again if we look into our own Bosoms, we shall there meet with strange desires and Breathings after *Eternity*. And after the Enjoyments, of all Sorts of Pleasures of this World, we are still weary and Dissatisfied, having a *Principle* within us that (unlike all the rest of the Creation) meets with no Adequate, proportionat Object below the *Moon*; a strong and Violent Presumption that it has it true Object somewhere else; which can be nothing but the Enjoyment of that *God* which Created it. Yet further, the very Checks of Conscience, and those natural inbred Notions we bring into the World with us of *Right* and *Wrong*, of *Virtue* and *Vice*, of *Rewards* and *Punishment*, are very strong and Pregnant Proofs of a *Deity*.

And so far the very *Heathens* arrived to know that there was a *God*, supream Power that guided and directed all things as it pleased; and hence proceeded their *worshiping* and *Sacrificing* to whatever they found did them good, or what they were afraid might do them hurt, as the *Sun*, *Moon*, *Stars*, and all the Host of Heaven.

When I consider how great a part of Mankind the *Heathens* have been, and (many of them) how entire in their *Morals*, me thinks I cannot with the bold Censurers of the Age pass a final Sentence of Damnation upon their immortal Souls; but, if it were possible, interpret St. *Pauls* words in their favour, where he tells us, That they having not the *Law*, are a Law unto themselves. And though we are told there is no other name under *Heaven* by which we can be saved, but only by *Jesus Christ*, yet, it may be, those words are to be understood of such as have had *Jesus Christ* sufficiently proposed to them; for we Read, that what the *Law* speaks, it speaks to those that are under the *Law*.

The other Branch of Gods works whereby he manifests himself to our natural Reason, are those of his *Providence*, which considered either in its ordinary or extraordinary *effects* and *productions*, is such that *Seneca* (though a *Heathen*) could not believe that any Man was so blind or ignorant as not to believe a *Deity*; his own words are those. *Qui dicit se credere Deos non esse, mentitur*; He that saies that he believes there are no Gods, dissembles or *Lies*.

Thus you see how by the light of Nature only, Men understand, that God is, and that he is to be worshiped. But for ever blessed be his holy Name, he hath not left us here, but hath given us a more sure word of *Prophecy*, the *holy Scriptures*, wherein he hath revealed himself to us; and which is here the most material, he hath confirmed the truth of them both by *Prophecies* and *Miracles*, such as some of the *Gentiles* could never boast of, *Miracles* truly so, and not feigned, like those of the *Egyptian Sorcerers*, and the *Juglars* of our days, that only seem to do things.

The

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The *Egyptians* experienced (but too truly) that their *Plagues* were real, and no dreams. The *Children* of *Israel* did pass through the *Red Sea*; they did drink of the Water, that came out of the *Rock* in the *Wilderness*, and their Thirst was quenched; they did eat of the *Quails* and *Manna* and were satisfied, and sustained for forty years together; and the *Miracles* at the delivery of the Law on *Mount Sinai*, deserves mentioning, for we read that the *Mount burnt* with *Fire*, and thick Darkness was round about it, and there was *Thunder* and *Lightning*, and the sound of a *Trumpet*, which sounded lowder and lowder, and the *Mount* trembled; and this was done not only in the sight of the *Elders* of *Israel*, but in the presence of all the People, who quaked and trembled thereat.

To the *Miracles* we may add the *Prophecies* which we meet with in *Holy Scriptures*, some of which were very particular, and circumstantial. It was told *Abraham* that the *Children* of *Israel* should be Strangers, and in Bondage in *Egypt* 400 years before, which *Prophecy* was fulfilled to a Day. The *Prophecy* about *Josiah* and *Cyrus*, named the very Men, and that of *Daniel* of the four *Monarchies* was very remarkable, he had seen only two of them, for the *Grecian* and *Roman* were then unthought of.

To these I might add the *Prophecies* concerning our *Saviour*, and how in every little circumstance they were fulfilled, a proof which will admit of no Objection, and will serve us to prove not only That God is, and that his Revelation of himself in his Word is true, but will also confirm the Truth of *Christianity* it self.

To what has been said I might add, that the Word of God has never been opposed, or contradicted by any, although it be found to agree both as to *Time*, *Place* and *Story*, with many prophane *Historiographers*.

Now the Truth of Gods Word confirms to us the truth of that Sacred *Mystery* of the *Trinity*, or the Three Persons in the *Godhead*, the *Father*, the *Son*, and the *Holy Ghost*. The *Father* Created all things of nothing: The *Son* Redeemed us from everlasting Death, when we were lost in *Adams* Disobedience; The *Holy Ghost* inspires all *God's Servants* with his Grace, and comforts them in all their Troubles and Afflictions; as if all the Three Persons in the *Trinity* had successively undertaken the care of our Eternal Happiness.

And yet we are not here to expect those extraordinary and supernatural Influences of the holy *Spirit*, which the *Prophets* and *Apostles* had in speaking with Tongues, they had never learn't, in *Prophesying*, casting out *Devils*, and working all sorts of *Miracles*: Not that Gods hand is shortned, or that he is not able to do what he hath formerly done, but for Reasons best known to himself (at which we can at the best but guess) he hath left off this way of proceeding with us, and now adays the *Holy Ghost* works only (or for the most part) in the use of means. And this shews the Vanity of our *Sectaries* and *Enthusiasts*, who pretend extraordinary *Revelations*, when we all know that they are long ago ceased.

Another thing we are assured of from the *Revelation of Gods Word*, is that we have *Souls* distinct from our *Bodies*, immaterial, rational and discursive in respect of their Essence, and immortal and incorruptible in regard of their duration; and this is that wherein we are said to represent *God Almighty*, and to be Created after his *Image*.

And to this *Doctrine* of the *Immortality* of the *Soul*, is also annexed and declared in *Holy Writ*, that of a future State, *Rewards* and *Punishments*.

Rewards of Everlasting bliss, and joy to the good and vertuous, which are commonly shadowed to us under the Notions of those things we have the greatest esteem for; as *Crowns*, *Treasures* which fade not away, *Rivers* of *Pleasures*, &c.

Punishments or endless Woe and Torment to the Wicked and Ungodly, figured in Gods Word by those things that to Flesh and Blood are most terrible and fullest of Horror, as *Everlasting Fire*, the *Lake* which burns with *Fire* and *Brimstone*, *utter Darkness*, &c. Of both which we may truly say, that they are such as neither *Eye* hath seen, nor *Ear heard*, nor entred into the Heart of Man to conceive. Let it suffice us then, that there shall be a *Resurrection* of the *Body*, and a reunion of it to the Soul to receive its Reward; though the Manner and Circumstances both of *Rewards* and *Punishments* be to us very obscure and unknown. And thus much of *Speculative Theology*.

Practical Theology.

Practical Theology, which is the other Branch of our Division is that which contains our Duty to *God* and *Man*; and this we have briefly comprehended in the *Decalogue*, or Ten *Commandments*, wherein we are always to observe, that every *Affirmative Precept* includes a Negative, and every Negative an Affirmative. That is to say, where we are commanded to Honour our *Fathers* and *Mothers*, we are forbidden to dishonour them; where we are forbidden to *Kill*, we are commanded to our power to preserve; and so of all the rest.

But to begin with that part of our Duty, which doth immediately respect God himself; It consists in our diligence and sincerity in his Worship, and is briefly laid down in the four *Commandments* of the *first Table*.

The Subject Matter whereof may be reduced to these main heads of *Adoration*, *Prayer*, and *Praises*.

Prayer for those good things we stand in need of, and hope to receive from God Almighty, who is the giver of every good and perfect gift; and *Prayer* for those Mercies and Favours which he hath already given us.

Both these are either publick or private; *Publick* when we joyn with the Church, or any lawful publick Assembly of *Christians* to make our requests known to God, or praise his holy Name for Mercies received; *Private* when we do the same things alone, or in our *Closets*.

There

There is this only difference between them, that our Publick performances should be more wary in Circumstances, as forms and gravity of Words, decency, and respect of Behaviour, and this for the sake of our *Neighbour*, that we give no occasion of scandal; though after all it must be confest that 'tis the integrity and soundness of the heart which *God* chiefly regards in both.

Next our Duty towards *God*, follows our Duty to *Man*, that is, our Duty towards our Selves and our Neighbours.

First of all, there are some Duties we owe our Selves, and these are all briefly comprehended in the vvorking out our own Salvation, which is the main business for which vve were at first created and came into this World.

The *means* and *Instruments* we are to make use of herein are principally these Three,

Faith in Jesus Christ.
Repentance from dead works.
Obedience, or newness of life.

Faith is a free Grace bestowed upon us by God Almighty, whereby we lay sure hold on the Promises made to Mankind, through the Merits and Intercession of *Jesus Christ*.

In which Definition we may observe in the first place, That this grace of Faith is not attainable by any human endeavours, but is the meer voluntary and free gift of God. And yet since he works (as is said before) in the use of Means, vve are still to frequent the Word *Read* and *Preached*, to converse with good Men, to desire and pray for his Grace, and no doubt but he will give it us.

Again, We may take notice, that it is not a bare Historical Faith, like that whereby we believe *Profane History*, or any thing else of that kind, but it is that whereby vve lay hold on and apply the *Promises* which *God* hath made to Beleivers generally, to our selves particularly, so that a true Believer does not only believe that *Jesus Christ* died for the sins of the World, but for his particularly, and so claimes a part and portion in that Satisfaction which he hath made to Gods Justice.

The next thing in order is *Repentance*, which is a hearty Sorrow and Contrition for sins past, joyn'd with setled purposes and resolutions of a new life.

I know not which of these two ought in right to be first placed, for there can be no true *Faith* without *Repentance*, nor no true *Repentance* vvithout *Faith*. They are Twins, as born at a Birth, nor can the vvit of Man devise to separate vvhat God has put together.

Repentance in the Greek is called Μετανοία, vvhich signifies not a bare Compunction, or Attrition, as the *School men speak*, but such a Sorrow and Affection of the Mind, as produceth a Change or Reformation; and hence it is that amendment and newness of life are the only Demonstrations and concluding Arguments of a true Faith, and a sincere Repentance.

And this leads us to the last of these *Instruments*, whereby we are to work out our *Salvation*, and that is a ready Obedience, and a universal compliance with those *Laws* and *Precepts* which *God* hath laid down in his *Holy Word* as a Rule for us to walk by. And because *Reformation* and *Obedience* are more descernible than our *Faith* and *Repentance*, which are only Acts of the *Mind* and *Spirit*, we must endeavour to satisfie both our selves and the World of the truth of the latter, by the sincerity of the former.

For trial then of our Obedience, there are Three things to be enquired into. If it be willing and chearful; and not for fear or by constraint; If it be universal and not partial; and if it be always growing and encreasing, dayly getting new Advantages and *Ornaments*. These are the infallible Marks of a good Man and a good *Christian*, and the only assurance we can have of *Heaven* and Happiness, whilst we are in this World. This is what we owe to our Selves; and now we shall take a short view of that Duty we owe our *Neighbour*.

And here (1). let me put you in mind of our Duty towards our Holy Mother the *Church*, both in owning her *Doctrines*, and submitting to her *Discipline*.

There are many *Companies*, or *Sects* of Men in the World, that pretend the next, and some the only way to *Heaven*. To say nothing of the obstinate *Jews*, who had once the keeping of those sacred *Oracles* that contain the *Types* and *Figures* of our *Christian Religion*; nor yet of the Ignorant *Mahometans*, whose miscellaneous Worship seems rather formed and modelled to preserve an earthly, than to get a Heavenly Crown. I shall only put you in mind of the purity of our Church of *England* by comparing it with some others in point of *Ceremonies*, &c. that call themselves *Christians*.

And amongst these, the *Greek Church* and the *Lutherans* will find no room in this small *Tract*. I will only speak a word or two of the *Romanists*, and the Dissenters of our own *Country*; Men of very different *Principles* (if you will believe them) and that agree in no one thing, but in their violent Hatred and Ill-will to us. The *Romanists* complain for our quitting some Ceremonies, that are by us adjudged Useless and Superstitious; and the *Dissenters*, for that we retain some, though never so grave and decent; these accuse us still of *Superstition*, those of *Sacriledge*; whence it appears, that even in these things we have still kept a Middle way between both, neither burthening the weak with *superfluous Impositions*, nor yet descended to those *base* and *slovenly Familiarities* with *God*, which the *Fanaticks* have both in Words and Behaviour.

I suppose this *Tract* will not be look'd upon as Demonstration to prove the Excellency of our *Church* above others; the Learned Men of our *Church* have done it sufficiently; however, if a Person unbiassed and disinterested were to consider but this very thing alone, he would be apt to think, even without Argument, that ours had the fairest Pretence, being placed in the middle, the Seat of *Vertue* her self.

Now since we find our selves thus beset with *Scylla* on the right, and *Charibdis* on the left hand, let us mind our Course and Steer steady, lest we suffer Shipwreck on the Rocks of *Heresie*, or be swal-

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swallowed up in the Gulph of *Schism*. Let us beware of the *Force* and *Insinuations* of the one and the other, and never doubt our safety as long as we keep within our own *Ark*, that is, within our own *Pale*, which without doubt is the best and surest *Bulwark* in the World against the Menaces and Dangers of them both.

2. We must be very careful of our Duty to our *Magistrate*; not only because our own *Lives* and *Interests* are bound up in his, but also upon a Religious and Divine Account; for he is *Gods Minister* and *Vicegerent*, and he that resisteth him, resisteth the *Ordinance* of *God*.

Our Duty to the *Magistrate* is briefly concluded in these two things, *Honouring* and *Obeying* him. The Particulars that these may be branched into would be too large for this little *Tract*, and make such a Body as this shew disproportionable; and therefore I refer you to such as have purposely writ upon this Subject.

The Third and last Obligation we have to our *Neighbour*, are the Duties we owe our Fellow Subjects, and these are briefly comprehended under the Notion of *Charity*, that Grace which shall last and endure when the Sun shall be darkned, and the Moon be turned into Blood, which shall be one part of our Happiness in Heaven to all Eternity.

It consists briefly, In doing them all the good we can, and forbearing to do them any Evil. Or its parts are *giving* and *forgiving*. Giving according to the capacity wherein God hath placed us, to such as stand in need of our *Charity*; and forgiving such as have any way injured us, as we hope that *God* for *Christ* sake will forgive us.

Nor must we think our *Neighbours Bodies* the only object of our *Charity*; their *Souls* are yet of more value, and as occasion may be offered must always experience our Love and Kindness in *Exhortations*, *Reproofs*, *Consolations*, &c.

And thus I have finisht this small Piece wherein though I have swerved from the Method which others have made use of, yet I hope I have omitted nothing that was altogether necessary to a Discourse of this kind, though a *Lock of Hair* may be wanting, or a *Finger* not so well shadowed, yet I hope I have not forgotten any of the principal *Limbs* and *Members* of this Body.

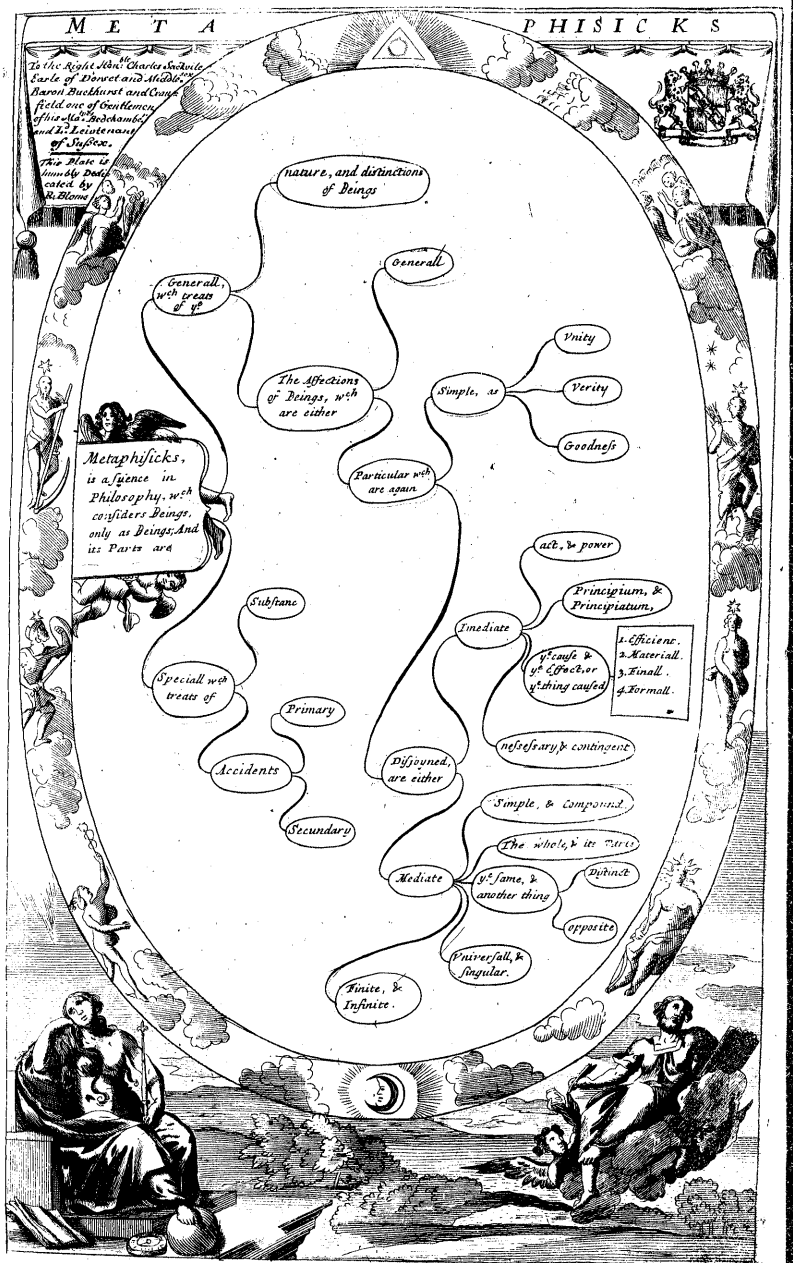
The *Doctrines* of our Church in general are comprehended in the speculative part of *Theology*, whereof I was saying the *Articles* of our *Creed* were a short Abridgment.

As to those *Doctrines* which distinguish us from other *Churches*, and are in especial manner said to be of the Church of *England*, I refer the *Reader* to the 39 *Articles*.

That there ought to be some kind of Discipline in the *Church*, no body that is well in their Wits will deny; But there are but too many that will not only deny the *Church* her due Power in it, but will needs make themselves *Judges* where they have nothing to do but to obey.

We believe that in things indifferent, that is, in such things as are in their own natures neither good nor bad, the *Church* hath absolute power of injoyning or forbidding them as she sees cause, for the sake of publick Order and Decency, of which I am sure she is the only, and indeed the only compleat Judge; And I cannot but wonder that those very Men should make so little esteem of the Churches Authority in some things, that are so positive and severe for it in others: For Example, that will deny her power of appointing *Rites* and *Ceremonies* and prescribing a set Form of *Prayers*, whereas they are so ridged for the same Translation of the *Bible* which the Church of *England* useth, and also for the observation of the *Lords-Day*, of which I am sure they can give no other Account or reason than the Churches Authority.

META-


METAPHISICKS
To the Right Hon.ble Charles Sackville Earle of Dorset and Middlesex Baron Buckhurst and Cranfield one of Gentlemen of his Ma.ties Bedchamber and Lt. Leiutenant of Sussex.
This Plate is humbly Dedicated by R. Horne
nature, and distinctions of Beings
Generall
Generall, wch treats of ye
The Affections of Beings, wch are either
Vnity
Simple, as
Verity
Goodness
Particular wch are again
Metaphisicks, is a Science in Philosophy, wch considers Beings, only as Beings; And its Parts are
act, & power
Principium, & Principiatum,
Immediate
1. Efficient. 2. Materiall. 3. Finall. 4. Formall.
ye cause & ye Effect, or ye thing caused
Substance
Speciall wch treats of
Primary
Accidents
Secundary
necessary & contingent
Disjoyned, are either
Simple, & Compound
The whole, & its Parts
Mediate
ye same, & another thing
Distinct
opposite
Universall, & singular.
Finite, & Infinite.

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METAPHYSICKS.

METAPHYSICKS is a *Science* which contemplates *Beings* as *Beings*; that is to say, abſtracted from all *Matter*.

The *Etimology* of the Word is from μετὰ, which ſignifies *præter*, *poſt*, or *trans*, and φυσικὴ, *naturalis*; that is, ſomething beſides, above or beyond Nature. Above or beyond Nature, becauſe this *Science* tranſcends Natural things, and is above that part of *Philoſophy* which we call *Phyſicks*; and beſides Nature, becauſe in her Doctrine thoſe *Affections* and *Diviſions* of *Ens* or *Being* are not handled, which *Metaphyſicks* treats of.

And for this Reaſon it is called *Philoſophy*, abſolutely and in oppoſition to all other, becauſe it is the moſt ſublime and noble part of it.

Again, ſometimes it is called the firſt *Philoſophy*, becauſe it treats of the firſt *Conceptions* and firſt *Principles*, upon which the *Principles* of all other *Sciences* are founded.

Sometimes it is called *Natural Theology*, becauſe it handles immaterial, incorruptible, and the higheſt things, as far as they are diſcernable by the light of Nature.

And ſometimes they call it *Wiſdom*, becauſe it diſputes of Firſt Cauſes, and of the higheſt and moſt difficult things.

The Material Object of *Metaphyſicks* is *Being*, the Formal Object or Manner of conſidering *Being* is as Being: ſo that *Ens* or *Being* is in this definition of *Metaphyſicks* the Subject; *Quatenus ens*, or as *Being*, is the Predicate, and makes the *Object* of this *Science*.

The *Diviſion* of *Metaphyſicks* is into General and Special: The General Part treats of the *Nature*, *Diſtinctions*, and *Affections* of *Beings*. The Special or Particular treats of their ſeveral kinds, as *Subſtance* and *Accident*.

A *Being* is that which hath a real *Eſſence*, that is, a true and not a feigned *Eſſence*, and ſuch an one as is fit really to exiſt.

There is a diſtinction between *Eſſence* and *Exiſtence*. *Eſſence* is that which hath a real Being, though it do not Exiſt, that is, though it be not in Act, as a *Roſe* in the Winter. But *Exiſtence* ſuppoſes that Act alſo, as a *Roſe* in its Seaſon.

Again, *Ens* or *Being* is divided into that which hath a *Being* in Nature, as an *Horſe*, an *Houſe*, *Fire*, *Water*, &c. or that which hath no other Being, but in our Thought and Conception, as a *Chimera*, or any *Monſter* we can imagine that never yet was. And this is called *Ens Rationis*, or a Being in our Reaſon.

Theſe are the moſt ordinary and general diviſions of *Ens*, or *Being*; and now we come to its *Affections*.

That *Ens* or *Being* hath *Affections* is certain; becauſe there are ſome things reciprocated with it, which are not at the firſt Conception we have of it, but follow that firſt Conception: For Example, *Unity*, *Verity*, *Goodneſs*, to be in Act, or in Power, and theſe *Metaphyſicians* call ſimple *Affections*.

There are ſome other that are not reciprocated with it, but divide it not as *Genus* is divided into *Species*, but as a *Subject* is divided into its *Accidents*; and ſo they cannot be ſo large, for extend as far as the Being it ſelf. Such kind of *Affections* are *Cauſe*, *Effect*, *Neceſſary*, *Contingent*, and many other of the like kind, and theſe are called *Disjunctive*.

Firſt, We are to treat of thoſe Affections of *Being* which are reciprocated with it, and they are theſe three, *Unity*, *Verity*, and *Goodneſs*.

By *Unity* we muſt by the way obſerve, that the *Unity* which is the reciprocal Affection of Being is *Unity* in General; ſo *Colour* is general in the Adequate Affection of a mixt Body; for it is truly ſaid, No *Body* is without a *Colour*, and no *Colour* without a *Body*: But this is not to be underſtood of any one *Colour* in particular, but of *Colour* in *General*.

One Diviſion of *Unity* is into that which is one by it ſelf, and one by Accident.

Another is into Indiviſible and Undivided. *Indiviſible* is that which is neither divided in Act, nor yet in Power: *Undivided* is that which is not actually divided, but yet hath a power or capacity of being divided.

The laſt diviſion of *Unity* is into Univerſal, Formal, and Individual.

That which is oppoſite to Unity is *Many*, actually divided.

Verity is the Conformity in the Conformity of any thing with the Underſtanding.

This is the general definition of *Verity*; but as it is *Metaphyſically* conſidered to be an affection of *Ens* or *Being*, it is ſaid to be that by which a *Being* may be known or apprehended by the Underſtanding, to be real and ſuch as it is: And the conformity and relation of the *Being* with the *Underſtanding* is founded in this Truth. Thus we diſtinguiſh between that which is true *Gold*, and that which only appears to be ſuch: for true *Gold* hath a certain entity particular to it ſelf, cognoſcible by the Underſtanding, which can't be ſaid of apparent or ſeeming *Gold*. And thus we diſtinguiſh betwixt a true *Body* and a *Phantaſtick Body*, or that which only appears to be a Body. The true Body is apprehended by us according to the eſſential and proper conception of *Body*, but the other cannot apprehend ſo.

Ens

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Ens Verum then (or a true Being, as *Philoſophers* ſpeak) is that which is apprehended by the Underſtanding to have a *Being*, like that which is proper and Eſſential to ſuch a Nature. So the Office or Buſineſs of this *Verity* is to diſtinguiſh *Real Beings* from Apparent ones, and therefore excludes all ſorts of *Entia Rationis*, or ſuch things as only have a *Being* in our Underſtanding, and no real one of themſelves.

The oppoſite or contrary thing to this *Verity* is *Falſity*, which *Falſity* is founded in the Underſtanding only, and not in the things; for Example, That *Metal* which only ſeems to be Gold is falſe, not but that it hath in it ſelf a true Nature, as a Body of another kind; but it is falſe *Secundum quid*, and in this ſenſe, that it agrees not with that conception which we have in our Underſtandings concerning true *Gold*.

The laſt ſimple Affection of *Being*, is *Goodneſs*. *Things* or *Beings* are ſaid to be *Metaphyſically Good*, as they have that Eſſence whereof they are capable; or more plainly, as they have that Eſſential perfection which is convenient or agreeable to them. And in this ſenſe every thing in the World, whether Subſtance or Accident, is ſaid to be good.

The other Affections of *Being* we ſaid were called Disjoyned, becauſe they do divide and diſjoyn it, and they are either *Immediate*, or *Mediate*. Immediate, as *Act* and *Power*, *Principium* and *Principatum*, that is, the Principle of a thing, and the thing it ſelf; The *Cauſe*, and the Thing cauſed; Neceſſary and Contingent. Theſe are the Immediate disjoyn'd Affections of *Ens* or *Being*.

We ſhall begin with *Act* and *Power*.

By *Act* we are to underſtand a *Being* that doth exiſt, and by *Power* that which doth not always exiſt, but is capable of exiſting.

Thus a *Log* of *Wood* is a Statue in *Power* we ſay, becauſe a *Statue* may be made of it; but when the *Carver* has wrought it up, it is a *Statue* in *Act*. So that this Diviſion of *Beings* into *Actual* and *Potential* is Univerſal, and comprehends all the *Beings* in the World, for whatſoever it is, either in *Power* or in *Act*.

But here we are to obſerve, that ſometimes the *Power* and *Act* do conſiſt together, and the *Act* doth not always take away or deny the *Power*: For Example, The *Act* of *Laughing* in Man doth not at all take away the *Power*. And yet ſometimes the *Act* doth wholly take away the *Power*; for Example, A *Rule* of two Foot long hath a *Power* of being divided into two *Rules* of a Foot long apiece; but as ſoon as it is Actually divided, it hath for ever loſt that *Power*.

But to give you ſome of the Diviſions of *Power*.

Power is either *Univocal* or *Equivocal*, as they ſpeak, that is, *Power* either properly or improperly ſo called; that is *Power* improperly ſo called, which is attributed to thoſe things which are never really in *Act*. And this *Power* is either proper to the *Mathematicians* or *Logicians*.

A *Mathematical Power* is that which *Mathematicians* feign to themſelves, or ſuppoſe, abſtracted from all kind of *Bodies* or *Matter*, as when they ſay, A right Line is in *Power* a *Triangle*.

A *Logical Power* is a meer denial of a Contradiction; as when they ſay, The *Earth* may or hath a Power to be removed higher or lower from the place where it is, becauſe ſuch a Removing doth not deſtroy its *Eſſence*, and implies no Contradiction. And to this *Logical Power* is referr'd that which in *Metaphyſicks* is called *Objective Power*; that is, a Non-repugnance of any thing to be produced by ſuch or ſuch a Cauſe. Whence it is plain that this *Objective Power* is not real, becauſe it only conſiſts in a bare Negation of an Impoſſibility.

Beſides this *Negation* was true of the World, before any thing of it was Created by God, and therefore is a formal *Non Ens*, or no *Being* at all.

That *Power* which is Univocal or Proper, is either *Active* or *Paſſive*. An *Active Power* is in that which tranſmutes and produceth any thing in another Subject: The *Paſſive* is the Power of being produced, or changed in the *Subject*.

The *Active Power* is either Infinite, as that of *God*; or Finite, as that of the *Creature*.

The *Active Power* of God is called *Omnipotence*, whereby he can do every thing that is not contrary to his own *Eſſence*, or implies not Contradiction; for we muſt not believe, that Gods *Omnipotence* conſiſts in doing whatever we can conceive. So God can't Lye, becauſe it is contrary to his *Eſſence*; nor Create a Man which ſhould be Irrational, for then at the ſame time he ſhould be a Man and no Man, Rationality being his very *Eſſence*.

The Active Power in *Creatures* is either Rational, or Irrational.

Rational, which is indifferently free to ſeveral kinds of Acts, as is the Will of Man.

Irrational, which is determin'd to one *Act* alone; As the Power of burning in Fire is to burn, which if it be applyed to Combuſtible Matter can't ſuſpend the *Act*, but muſt needs burn.

A *Paſſive Power* is divided, firſt into that which may either be, or not be, which *Philoſophers* call Power of *Contradiction*. Such properly the Power of Contingent things is ſaid to be.

Such a Power hath all Matter under the *Moon* of becoming a Body Animate, or Inanimate; and ſuch a Power hath a piece of *Timber*, of being made either a *Statue*, or a *Chair*.

Again, this *Paſſive Power* is divided into *Phyſical*, and *Metaphyſical*. *Phyſical* is a power of Matter to receive Forms, either *Subſtantial* or *Accidental*: *Metaphyſical* is the power of any Subſtance, whether *Material* or *Immaterial*, to receive Accidents.

Act is divided into Firſt and Second.

The firſt *Act* is the *Eſſence* of any thing, as Reaſon is ſaid to be the firſt *Act*; but to Reaſon or Diſcourſe is the ſecond *Act*.

Again, *Act* is divided into Perfect and Imperfect; A *Perfect Act* is that which is directed to no further Act: An *Imperfect Act* is that which is directed to ſome more Perfect.

Thus

Thus *Motion* is an Imperfect Act, becauſe it is the way to a more Perfect Act, to wit, the *Form* which is acquired by that Motion; but the *Form* it ſelf, becauſe it is no further directed, is ſaid to be a *perfect Act*.

The next immediate disjoyn'd Affection of *Being* is *Principium* and *Principiatum*, the Principle, and the thing Principiated, if we may ſo ſpeak for want of Terms.

A *Principle* is that from which any thing is made or known, or from which any thing proceeds after any manner whatſoever.

To give any thing the name of a *Principle*, there are theſe two things required; *viz.* 1. That it be before the thing Principiated, for ſo the very Name alone informs us. Secondly, That there be ſome connexion between the *Principle* and the thing Principiated; for the Child that was born yeſterday can't be ſaid to be the *Principle* of the Child which was born to day; becauſe though the one were before the other, yet there is a connexion betwixt them.

The main Diviſion of *Principles* was implied in the Definition, and that is this, *Principles* are either of *Things*, or of *Knowledge*.

There is alſo another Diviſion of *Principles*, into ſuch as are Cauſes; As the *Father* is the *Principle*, and likewiſe the Cauſe of the *Son*: And ſuch as are not Cauſes; As *Privation* is the *Principle*, but not the Cauſe of this or that Form.

Principles are before the things that are Principiated by them, both in *Time*, *Nature*, *Order*, and *Knowledge* or *being known*.

The thing Principiated, is that which hath the ſame order to its *Principle*, which *latter* hath to *former*. And from what hath been ſaid of *Principles*, we may judge of things Principiated.

We come to ſpeak of the *Cauſe*, and the thing *Cauſed*, or the *Effect*.

A *Cauſe* in general, is that by whoſe Power any thing is.

Its *Principal*, and firſt *Diviſion*, is into firſt and ſecond.

That is ſaid to be the *firſt Cauſe* which is firſt and higheſt in the order of Things, and that is *God* alone. Or elſe, that is ſaid to be a *firſt Cauſe* which is the next to, and doth immediately produce the *Effect*: As for Example, *Rationality* is the firſt Cauſe of all the Properties which are found in Human Nature.

The *ſecond Cauſe*, if it be taken in oppoſition to the *firſt Cauſe* in the former ſenſe, it is then every Cauſe in Nature, every thing but *God* only; and ſo the other *firſt Cauſe* is alſo a *ſecond Cauſe*.

But if it be taken, as it is oppoſed to the *firſt Cauſe* in the ſecond ſignification, it comprehends all remote Cauſes; that is, all thoſe other Cauſes which have this Cauſe (called the firſt in the latter ſignification) between them and the Effect.

Cauſes are theſe four in Number, *Efficient*, *Material*, *Formal*, and *Final*.

The *Efficient Cauſe* is that which by it ſelf produces any Effect, and ſo it is diſtinguiſhed from all the other three. It is divided into *Phyſical* and *Moral*.

Phyſical is every Cauſe that hath any real influence upon the Effect, or which doth truly and by it ſelf contribute to the *Eſſe* or *Being* of the *Effect*.

Moral Cauſe is ſuch, as though it do not really operate in producing the Effect, yet it has ſuch an influence upon our Manners (as they ſpeak) that it ſeems to confer ſomething to the production of the Effect. Such Cauſes are *Counſellors* or *Inſtructors*, and ſuch as do not hinder when it lies in their power to do it.

Again, The *Efficient Cauſe* is divided into the *Principal Cauſe* and the *Inſtrument*; As the *Smith* and his *Hammer*.

It is further divided into *Equivocal* and *Univocal*. *Equivocal*, as when *God*, the *Sun*, or the *Stars* are ſaid to produce any thing: And *Univocal*, when any thing produceth another of its own Species or likeneſs.

The laſt diviſion of *Efficient Cauſe* is into Immediate and Mediate. *Immediate*, as when the *Sun* gives its light to the Earth by its ſelf; and *Mediately*, when it reflects its light to the Earth from the *Moon*.

But to ſpeak ſomething more particularly of *God Almighty*; We muſt know, that in *Metaphyſicks* God is conſidered either generally, as he is the *firſt Cauſe* of all Beings; or ſpecially, as he is *Himſelf* the firſt of all Beings.

As He is the *Firſt Cauſe* of all things, He may fall under a threefold Conſideration in regard of his three Operations, *viz. Creation*, *Conſervation*, and *Cooperation*, or concurring with *ſecond Cauſes* in producing their Effects.

Concerning *Creation*, there are many things that may be enquired into, which becauſe they properly belong to *Theology* we ſhall omit, and only conſider whether a Man by the meer Light of *Reaſon* may underſtand and prove, that *God* is the *Efficient Cauſe* of the World, and likewiſe what he can by the Light of Reaſon diſcern of the Circumſtances of that great Work.

As to the firſt, 'tis believed, that by the Light of Natural Reaſon alone a Man may arrive at the knowledge of a *firſt Cauſe*, by which all other things were produced, ſuppoſing no precedent Matter at all. And of this Opinion were *Thomas Aquinas*, *Scotus*, *Halenſis*, *Durandus*, *Suarius*, and other Learned men.

But to come to the Proof: The firſt *Argument* ſhall be taken from the nature and condition of the *Materia Prima* or firſt Matter of all things; for if we can prove *God* to be the *Creator* of all this viſible World. We proceed thus:

The firſt Matter was either from it ſelf, or from ſomething elſe: It can't have its being from its ſelf, for then it would have the higheſt Perfection that any thing can have; that is, to have infinite Power and Vertue, and to depend on nothing but it ſelf for its Being. I ſay, If it had its Being from it ſelf it is *Ens perfectiſſimum*, the moſt perfect Being of all other, which is abſurd; for it is the worſt and moſt imperfect of all *Immaterial Subſtances*.

It muſt needs therefore have its *Being* from ſomething elſe; that is, it muſt needs be pro-

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duced by some other cause. Now if it be produced by something else, it must be either produced by *Matter* that was pre-existent to it, or by no *Matter*. Not from some *Matter* that was pre-existent to it; for that were absurd to say, there was some *Matter* before the first *Matter* (for we speak now of the first and most simple *Matter*.) And if it were produced by no pre-existent *Matter*, then of necessity it must be Created (that is to say, made of Nothing.) If therefore *Matter* be by any Cause created or made of Nothing, that Cause must needs be of Infinite Power and Vertue; for no *Being* can produce something out of Nothing, but that which is of Infinite Power; the Reason is, because there is an Infinite Distance between *Something* and *Nothing*, which requires an Infinite Power.

Now if the Power of this Cause which produced the *first Matter* be infinite, so must also its *Essence*; for to be Infinite in Operation, supposes of necessity Infinity of *Being* also. Again, If this Cause be Infinite, then all other *Beings* are Finite, and depend upon it; for there can be but one only Infinite. And this I think sufficient to prove a *first Cause*, not only of all Visible, but all Invisible things whatsoever, which is *God*.

To this Argument some have thus Objected, That to *Create* there is required an *Infinite Power*; but no such *Infinite Power* can be demonstrated, and therefore there can be no *Creation*.

To which we Answer, That it is not necessary first to demonstrate an *Infinite Power*, and thence to prove the *Creation*; but it suffices to demonstrate the *Creation*, and thence to prove an *Infinite Power*, which I think is done in this Argument.

As for the Argument they draw from that *Axiom, Nothing is made of Nothing*, we say the *Axiom* is only to be understood of *Finite* or *Second Causes*, and so does not reach the thing in hand.

Thus 'tis proved, that by the Light of Natural Reason it may be known, that there is one first *Efficient Cause* and *Infinite Essence*, which is all one as if we said, *God*. But the Doubt that remains is, That if it can be demonstrated that *God* created the *World*, may it not be as well demonstrated that he created it from all Eternity? Or can it be demonstrated, that it was made at the Beginning of Time, that is, at a certain time?

So that there are three Opinions to be examined; The first is that of the *Peripateticks*, who think it demonstrable (that is, by Natural Reason) that the World was created by God from all Eternity.

The second Opinion is Theirs, who think that it can neither be demonstrated, that the World was Created by God from all *Eternity*, nor yet that it was Created at the *Beginning of Time*; and so they think it possible either of the two may be true, and that neither of the Opinions can be refuted by *Natural Demonstration*.

The third Opinion is, that it is demonstrable by the Light of Nature, that the World was Created at the *Beginning of Time*. To every one of these we shall speak apart.

We shall begin with the first, where we shall prove against *Aristotles* own *Principles*, and a third, which though it be not evidently set down in his *Philosophy*, yet 'tis plain to Natural Reason.

The first *Principle* is, That there is one first *Efficient Cause* of all things; and this they admit who hold a *Creation from Eternity*.

The second is, That the first Cause or Being is endued with *Understanding* and *Will*; which is plain in *Aristotle*.

The third is, This first Cause acts freely, and is not constrained by any Necessity of Nature: And this is plain, because *Liberty* is the very *Essence* of the Will. And again, If this first Cause did act by the *Necessity* of *Nature*, it should have a more imperfect and ignoble way of Acting, than Men themselves have.

Thus having laid down the *Principles*, the Argument follows.

That which Acts freely, can Act when it will, and also forbear Acting when it will.

But the *first Cause* in the Creation of the World did Act freely.

Therefore it could Create the *World* when it pleased, and forbear the Creating when it pleased. And so it is not necessary that the *World* should have been from all Eternity, but it might be Created in time.

And now let us consider of those Arguments, that *Aristotle* brings to prove the *Eternity* of the World.

His first Argument is this, If the Motion of the *Heavens* be not from Eternity, then there was some other first Motion. If there be another first Motion, then that Motion began; and if it began, then there was a Motion before the first Motion; for the beginning of that Motion supposes a *Change* or *Motion*, because without *Change* or *Motion* nothing begins or is generated.

To this we Answer in short, That in the Beginning of Time, both the *Heavens* and their *Motion* began to be at once; but they were not produced by any *Motion* or *Change*, but were *Created*, and *Creation* they tell us is no *Motion* or *Change*, because *Motion* or *Change* is nothing but an altering of state or condition; and this can't properly be said of that which before had no state or condition, as the *World* had not, because it was simply Nothing.

His second Argument is from *Time*. If *Time* (says he) had a Beginning, once it was not, and afterwards it began to be; but *Before* and *After*, or *Sooner* and *Later*, are the very Specifick difference, and can't be without Time; therefore it follows, that *Time* was before *Time*, which is absurd.

To this we Answer, That when we say that once *Time* was not, and that afterwards it began to be; that same *Once* doth not import the difference of real and true Time, but only Imaginary, and that was always. Just as *Philosophers* say, There was before the World was made, an Imaginary Space in vvhich afterwards it was made.

His third Argument is this, That either *God* could have made the World sooner, but would not, or would but could not; or else, that he neither would nor could. The first of these three things is not to be said, because that would argue envy in *God*. Nor the Second, because that would argue Weakness; Nor the Third, because that would argue both. Therefore it remains that he always both could and would Create the World and so it was Created from Eternity.

To this we answer, That *God* had from all Eternity both a *Power* and a *Will* to Create the World at the beginning of Time; and that it was neither Weakness nor Envy which made him defer it so long, but 'tis very probable it was the greater Manifestation of his own *Glory* and *Power*; Because from that late Creation it appeared plainly that *God* did not work by the necessity of Nature, and that he needed it not, but was from all Eternity happy in himself.

We come now to the second Opinion, the asserters whereof are at some difference amongst themselves.

Some say the World was just as it is from all Eternity, with its continual changes of Generation and Corruption; and shall also continue to all Eternity just as it is, but yet with some dependance on the *Creator*.

But this Opinion cannot be defended, by reason of the Absurdities that would follow upon it; for instance take this one. If the World hath continued, and been as it is from all Eternity, and Men have from all Eternity been born, and dyed, it must needs follow then that there are an infinite number of *Souls* separated from *Bodies*; which is point blank contrary to that Opinion of *Aristotle*, that there can be no infinite number actually. And if they say that this he speaks only of *Bodies*, and not of *Spirits*, they may consider, that if already there be an infinite number of *Souls*, and this number is daily increased; then Infinity may be increased, or something added to it, which is absurd.

Others there are that would limit the Opinion a little, and say, that the *World* and the motion of the *Heavens* hath been from all Eternity, though it may be Man hath not.

To these may be answered, That it is impossible that infinite revolutions of *Years*, *Months*, and *Days* should be past and gone; because Infinity can't be past, no more than it can be encreased; and then again there would be as many *Days* and *Months* as *Years*, for they would be all equal if the World had been from *Eternity*; for infinite *Days* are as many as infinite *Hours*, one Infinite being no greater than another.

There are others, that seeing the Absurdities of both these, would yet limit the Opinion of the Worlds Eternity thus. That it may have been from all Eternity, but without all Motion, or Operation till the beginning of Time.

To these we answer, That this were inconsistent with the Wisdom of God, who doth nothing in vain; and as *Aristotle* says, Always doth that which is best: Now it is better, and more convenient things should not exist, than that they should exist without any Motion or Operation, that is, without any use or fruit.

It may be therefore concluded, That they who assert the World to have been Created in the beginning of Time are in the right, and that according to Natural Reason the World may (now it is created) endure to all Eternity, because it depends upon an infinite Being, which supports it. And yet on the other hand it may be destroyed again when God pleaseth; because his Power is infinite; and he that made All things from Nothing, can again if he pleaseth bring all things (I mean except such as he hath declared to be Eternal, as Rational Souls) to nothing again.

And thus we may arrive to the knowledge of the first Cause, and the Creation of the World by the Light of Nature.

We come now to the second Operation of the first cause, which is the Conservation of the *World*, or *Providence*. And we assert, That God from the first existence of any thing, doth continually give it Being by his Conservation, which is the same Action in him with his Creation of it; just as the Sun at first enlightens the Air with darting its Rays through it, and conserves and keeps that light with the same Action of darting its Rays through it; So that we have no *Principle* that is sufficient to distinguish these two Actions, (if we may so call them). Again they are the same in their Principle, and in their *Terminus* or *End*; for both proceed from one first cause, and both terminate in one thing, to wit the Being of the thing conserved. But this belongs properly to *Theology*, and so doth the third Operation of the first cause, which is called its Cooperation with the second cause; and therefore we purposely omit to speak any thing of them here.

Thus far of *Efficient Causes*; the next of *Final Causes*; and both these are External Causes, whereas *Matter* and *Form* are said to be Internal.

The end or Final Cause is that for whose sake or cause any thing is done.

It hath several Divisions; as 1. It is divided into *Finis Cui*, and *Finis Cujus*; that is, the end for whom any thing is desired, as for the *Sick Man*, *Cure* is desired; here the *Sick Man* is the end for whom, or to whom.

Finis Cujus, the end of which is not the Subject for whose sake a thing is desired, as the other is, but something different from it, as *Cure* is desired for Healths sake; here Health is the end of which (as they speak) that is of the *Cure*.

2. The *End* is either *Formal*, or *Objective*. *Formal* is the Action about any Object. *Objective* is the Object it self of the Action. For Example, the last formal end of Man is the Beatifical Vision of *God*, the Objective end of Man is *God* himself.

3. The *End* is either *Ultimate*, which is referred to no other; or *Intermediate* which is not. Thus the Intermediate end of Eating is Health. The *Ultimate* or Matter is an inward Cause, out of which any thing is made by its own passive or receptive Power concurring. And it is either *Ex qua*, *In qua*, or *Circa quam*, that is, *out of which*, *in which*, or *about which*.

Matter out of which any thing is made, is 1. either *First* or *Second*, or 2 *Permanent* or *Transient*.

1. *Per-*

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1. *Permanent* is that Matter out of which fomething is made, and yet the Eſſence of the thing remains,as a *Cup* is made of *Gold.Tranſient* Matter is that which doth not retain its own Eſſence when fomething is made out of it, as when a *Chicken* is made of an *Egg*.

Matter is called in which, in regard of the Form exiſting in it.

Matter is called about which, in regard of the Agents operating about it diſpoſing it to receive the Form; ſo that the Matter is one and the ſame thing, but diverſly conſidered.

Form is the Reaſon of any things *Eſſence*, or that which makes a thing to be what it is, and diſtinguiſhes it from other things.

The firſt diviſion of *Form* is into Inward and Outward; By *outward Form* they underſtand nothing but the *Copy* or *Pattern* after which and in whoſe likeneſs any thing is made, and the *Exemplars*, or *Copies*. Or *Copies* are either Real or Intentional.

Real are thoſe *Exemplars* which do ſubſiſt, and are without the mind of the *Artificer*, and are obvious to ſence, and ſuch as *Artificers* have for the moſt part by them.

An Intentional *Exemplar* is the Image or *Idea* of the thing to be made in the Mind of the *Workman*.

Intrinſecal Form is that which conſtitutes the formed, either ſubſtantially or Accidentally: and hence we have that diviſion of Intrinſecal or Inward Form into *Subſtantial* and *Accidental*.

Accidental Form is that which ſubſiſts in the ſubſtance, either in part of it, or in all of it; As Whiteneſs in a *Wall*.

The *Subſtantial Form* is that which informs any body, and diſtinguiſhes it from other things, and is called *Forma partis*,in oppoſition to the Matter of that body.

And theſe Subſtantial Forms are ſuch as are either ſeparable from their Bodies (that is can, exiſt ſeparate from them) or not. *Inſeparable Forms* are only Rational Souls,all other Forms whatſoever are ſeparable.

The Cauſality of *Forms* in general conſiſts in the manner of their union to Matter, and their actuating and poſſeſſing it.

All Inſeparable Forms in *Bodies* are concluded to be nothing but Matter; But the ſeparable, to-wit, the Rational Souls are perfectly Immaterial. And it will here be worth our while to enquire a little into the ſeveral Opinions of *Philoſophers* concerning the Original of the Soul.

1. The firſt I ſhall mention is that of *Philo Judæus*, who teacheth that the Rational Soul is a particle of the Divine Eſſence, and is neither immediately created by God, nor yet derived from the Seed of the Parent, but miraculouſly inſpired from God himſelf. But this Opinion is ſo abſurd, that I ſcarce think it worth the naming, ſince the Eſſence of God is Immutable, and Indiviſible.

2. The ſecond is, that the Souls of Men were all created in the begining of the World out of nothing, at the ſame time with the *Angels*, and growing weary and diſdainful of *Heaven* and good things, began to love Earthly things, ſo that they were caſt down by God into Bodies as into Priſons for their puniſhment. But this we muſt not allow, becauſe of the many Abſurdities that would follow upon it. For why then ſhould God in the *Deluge* have delivered ſo many wicked Souls out of Priſon,and have loſt his Servant *Noah* behind? The ſame alſo might be ſaid of the deſtruction of *Sodom* and *Gomorrah*, and the preſervation of *Lot*.

Again, it would follow hence that the Reſurrection of the Body would be nothing but a returning to Priſon again, even to the Righteous themſelves.

Again, this would deſtroy all *Philoſophy*, becauſe this aſſerts that the Rational Soul was not appointed to be a part of Man, but is a compleat Subſtance in its own nature, and that Man conſiſting of *Soul* and *Body*, is but an *Ens*, or Being by Accident.

3. The Third is,That all Souls were created at firſt with the *Angels*, and ſent into *Bodies*, as the Bodies were prepared by Generation. This Opinion differs form the former, becauſe it doth not ſay that *Souls* ſinned in *Heaven*, and for their puniſhment were ſent down into *Bodies*.But the chief Reaſon why it affirms that all *Souls* were created at firſt, is becauſe that Text of *Geneſis* tells us, that *God* reſted or ceaſed from his Works.

The *Error* of this Opinion appears, in that we underſtand or remember nothing of that former State. Nor will it ſuffice to ſay, that being ſunk into theſe groſs and earthly *Tabernacles* the Soul hath loſt all its Memory of former things; for ſince it is natural for the *Soul* to be joyned to the *Body*, it is not reaſonable that by being joyned to its proper matter it ſhould thereby receive ſo great detriment and diſadvantage.

And whereas they object, that of Gods reſting from his Works,we underſtand that only thus, That he then reſted or ceaſed from producing any new Species of *Beings*.

4. The Fourth Opinion is,that the *Souls* are begotten by the Parents, and that the *Sons Soul* is from the Fathers as his Body is. To this we ſhall anſwer by and by.

5. The Fifth is, that the Original of Souls is not known, nor ſhould we adventure to determine any thing in the matter. A modeſt thought indeed,but ſuch as *Baronius* thinks below a *Divine* and a *Philoſopher*.

6. The Sixth, and that which we hold is, That Mens Souls are not from their Parents, or from any Matter, but created by God,and put into the Matter when it is conceived and prepared for Animation.

The Arguments for confirming this Opinion and refuting that of *Souls* being begot by Parents, are theſe.

1. If the *Soul* were Generables, it would be Corruptible. To this, thoſe of another Opinion Anſwer, That the *Soul* is Corruptible, becauſe it depends upon *Matter*, both in its Production and Being, they ſay; but that it ſhall endure to Eternity, becauſe God hath determined to preſerve it: And if you ask them, Why the *Soul* conſidered in it ſelf ſhould be Corruptible, They Anſwer thus; Becauſe if *God* ſhould ceaſe from that Act whereby he keeps and preſerves the *Soul*, it would preſently return into Nothing.

But this Anſwer doth not ſatisfie us, Becauſe, firſt of all, when Divines and *Philoſophers* divide into *eternal* and *fading*, they do not then mean that any Subſtances are eternal, becauſe God doth not preſerve them by his influence, but becauſe they can't be deſtroyed by any action of any Creature; and in this ſenſe not only *Angels* and the *Heavens*, but alſo the Souls of Men are ſaid to be incorruptible. Again, our Adverſaries own that Souls can't be deſtroyed by any *Phyſical* or material Action; and hence we infer, That they cannot be produced by any material Action. And why cannot they be deſtroyed by any material Action? Becauſe their Subſtance is ſpiritual. For the ſame reaſon they cannot be produced by any material Action, becauſe their ſubſtance is ſpiritual.

2. A Second Argument againſt their Opinion is,That God would have the Soul of Man ſubſiſt without the Body after Death, but the Souls of Beaſts to periſh with the Body; and therfore he gave the rational Soul a Nature independent on any bodily Matter, that by reaſon of that nature it might ſubſiſt without bodily Matter. Whence we infer, That the Soul according to its Nature is independent on *bodily Matter*; And if the Soul in regard of its Eſſence doth not depend on Matter, then it doth not neceſſarily preſuppoſe Matter out of which it is made, nor is it produced by the power of Matter; ſo then if the Soul according to its Eſſence doth not depend upon *Matter*, Matter doth not concur to give it its Being; for if Matter did concur to give it its Being, then the *Soul* as to its Being ſhould depend upon Matter.

3. The Third *Argument* is this. No active Power acts beyond its own *Genus*; But the *Intellective Soul* exceeds the whole *Genus* of bodily Nature, becauſe it is a ſpiritual ſubſtance, therefore no bodily Power can produce a *Soul*.

Now every Action of the ſeminal faculty is from a bodily Power, for it proceeds from the vegetative Power; Therfore an *Intellective Soul* cannot be produced by that Power; for ſo an Agent might produce an Effect much more noble and excellent in nature than it ſelf, which is impoſſible.

4. Fourthly, Thoſe that maintain the contrary Opinion are forced to admit of many Abſurdities to avoid the force of ſuch Arguments as are brought againſt it, to wit, That the *Soul* is not a ſpiritual Subſtance; That the Soul might be deſtroyed by a *Phyſical Action*, if God did not by his ſpecial Influence preſerve it; which Aſſertion derogates not only from the worth and excellency of our *Souls*, but alſo from the Divine Wiſdom, which intending our Souls ſhould exiſt without the Bodies, gave them no fit or proper Nature to do ſo.

The next *Affections* of *Ens* or *Being* we are to treat of, are *Neceſſary* and *Contingent*; and this Diviſion is very well placed immediately after the former, becauſe things are ſaid to be neceſſary or contingent, chiefly in regard of the cauſes from whence they proceed.

A neceſſary thing is that which cannot be otherwiſe.

They are to divide Neceſſity into the Neceſſity of the Propoſition, and the Neceſſity of the Thing; Where note, that the Neceſſity of the Propoſition is always founded in the Neceſſity of the Thing. For Example; becauſe God can't but be juſt, therefore this Propoſition, *God is Juſt*, can't but be true.

And likewiſe we may here obſerve,That all thoſe Diviſions which are attributed to the Neceſſity of the Thing, may alſo be attributed to the Neceſſity of the Propoſition: For if the Thing be this neceſſary, the Propoſition muſt needs be ſo too.

The Neceſſity of the Thing is two-fold; there is one kind of Neceſſity which belongs to a Thing by it ſelf, conſidered alone; and there is another kind of Neceſſity which belongs to a Thing in its order and relation to another Thing, as they agree or diſagree.

The former of theſe they call the Neceſſity of Exiſtence, or ſimple Neceſſity, or incomplex; and the latter they call Neceſſity of the Relation or Coheſion of Things, and likewiſe compounded, or complex Neceſſity.

The former is of it ſelf, and in its own nature neceſſary; the latter as it is conjoyned with ſuch and ſuch cauſes.

The Neceſſity of Exiſtence, as to ſpeak, is either *abſolute*, or *ſecundum quid*, or in part.

Abſolute Neceſſity of Exiſtence only belongs to God, becauſe he only ſo exiſts as to depend on nothing, and cannot have his Being taken from him.

Neceſſity of Exiſtence *ſecundum quid* or in part, belongs to incorruptible Creatures; As *Angels*, the *Heavens* and *rational Souls*, becauſe abſolutely they may not be, becauſe they depend on a free Agent.

The neceſſity of Coheſion belongs not to things conſidered barely by themſelves, but as they are related and cohere to other things.

And if we conſider the Coheſion, we ſhall find that in ſome it is *Neceſſarium*, and one of thoſe things can't be without the other; for Example, *Socrates* and his *Nature*. There is another Coheſion amongſt things which may be diſſolved, and this is ſaid to be *Contingent*; As Coheſion between *Socrates* and his ſeveral *Accidents*.

The Neceſſity of *Exiſtence* then is a Neceſſity in any by it ſelf; the Neceſſity of *Coheſion* is that, whereby two or more things do adhere or ſtick together, not to be ſeparated.

This Neceſſity of *Coheſion* is by *Philoſophers* divided into the Neceſſity of the *Conſequent*, and the Neceſſity of the *Conſequence*. The Neceſſity of the *Conſequent* is when one thing ſo follows another, that they can't by any means be ſeparated; As, That *Man is a living Creature*. The Neceſſity of the *Conſequence* is that Neceſſity, whereby things that are not by their own nature determin'd or forced to adhere together, do yet ſo ſtay together as for the time they can't be ſeparated, and that by reaſon of the determination of ſome outward Cauſe or Suppoſition. Thus we ſay, That he who by an irreſiſtible Force hath changed his place, did it by Neceſſity; becauſe though the *Man* and *Changing of Place*

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be things which are by no means determin'd to ſtick together, yet by this outward Force they are ſo united, that for the time they can't be ſeparated; for ſuppoſing an irreſiſtible Force, the Man muſt of neceſſity Change his Place.

Contingent is ſaid to be that which may be otherwiſe. And this *Contingency* is either equal on both ſides, that is, it may equally be ſo, and not be ſo; or elſe *Contingency* may be ſaid of thoſe things which are ſo for the moſt; or laſtly, *Contingency* may be of thoſe things that are ſeldom ſo.

There are other particular disjoyn'd Affections of *Being*, which are Mediate, as *Simple* and *Compound*.

1. *Simple* is that which can't be reſolved into more; *Compound* is that which may: For Example, The *Heavens* are a Simple ſubſtance, becauſe they can be reſolved into no more kinds of Subſtance; but the *Earth* is a Compound, becauſe it may.

Compoſition is either *Real* or *Imaginary*.

Real, which either conſiſts of *Matter* and *Form*, or of *Integral parts*, or of *Degrees* of Intenſion, or of *Eſſence* and *Subſiſtence*; As *Angels*.

Imaginary Compoſition is the Act of Reaſon, whereby we do in our minds joyn two different things together, and make a third of them.

2. Whole, and its Parts. The *Whole* is that which contains the *Parts* contained, ſo that they are one.

There are two Things to the making up of that which is called *Whole*.

A Plurality of *Parts*, and a Union of them beſides.

The *Whole* is ſaid to be either,

1. *Eſſential* is that Whole whoſe Parts are different in *Power*, but one and the ſame in *Act*: And this Whole is either *Phyſical*, as the *Soul* and *Body* make one *Man*; and *Logical* or *Metaphyſical*, whoſe Parts are only diſtinguiſh'd by our *Reaſon*, as the *Species* are in any *Genus*.

2. *Integral* is that Whole which contains many Parts only by *Continuity*, or *Contiguity*, as they ſpeak: And theſe Parts are either Similar, as Drops of Water in a *Glaſs*; or Diſſimilar, as the *Eye* and the *Hand* in the *Body*.

3. *Univerſal* in regard of its Parts, which are Singular, as *Genus*, in reſpect of *Species*; *Animal*, in regard of *Man* and *Beaſt*, and the like.

4. *Numeral*, as *Ten* contains ſo many *Ones*.

5. *Potential*, or *Poteſtative*. This Whole contains ſeveral Powers or Faculties, which like Parts make up the Whole; as the *Soul* contains the *Underſtanding*, *Will*, &c.

Part is a portion of the *Whole*, which together with its Fellows is fit to make the Whole.

Parts are alſo like the *Whole*, ſaid to be *Eſſential* and *Integral*, or *Similar* and *Diſſimilar*.

The next Affection of *Being*, in the Order of our Method, is *The ſame* and *Another*.

The *Same* is that which can't be divided, or diſtinguiſhed from it ſelf; and is divided into, The Same *by it Self*, and the Same *by Accident*.

The *Same by it Self* is either *generical*, as when *Man* and *Beaſts* are ſaid to be the ſame as to their *Animality*; or *ſpecifical*, as *Peter* and *Paul* are of the ſame Species; or *numerical*, as *Peter* is the ſame *Peter* being old, that he was when young.

The *Same by Accident* is ſaid of thoſe things which agree in their *Accidents*, as when an *Horſe* and an *Ox* are both *White*, &c.

Another thing may be underſtood by what hath already been ſaid of *the Same*. Some other Things are only *diſtinct*, and ſome are *oppoſite*.

Diſtinction barely diſtinguiſhes one thing from another, with ſuppoſing any contrariety in them. And is either *Real*, and ſuch as is found in the things themſelves; or elſe *Imaginary*, ſuch as we make in our own Minds.

Oppoſition is a repugnance of things, which will not let them be in the ſame Subject after the ſame manner.

Oppoſition is either *Negative* or *Poſitive*.

Negative Oppoſition is either Contradictory, as *Being* and not *Being*; or Privative, as *Sight* and *Blindneſs*.

Poſitive Oppoſition is either Contrary, as *Heat* and *Cold*; or Relative, as *Father* and *Son*.

The next *Affection* of *Ens* or *Being*, is Univerſal and Singular. And this Diviſion of *Being* is only the Act of the Mind; for in Nature there is no ſuch thing found as an *Univerſal*. But we underſtand by it ſomething, which contains under it many Singulars of the ſame Species, or ſuch as we imagine it to be. *Singular*, or *Individual*, is that which can't be divided into more things like it ſelf. Thus *Humane Nature* is the *Univerſal*, in regard of the Nature of *Peter* and *Paul*; but the Nature of *Peter* is Singular, and can't be divided, nor doth it comprehend any more *Humane Natures* than his own. There are ſome that refer *Univerſal* and *Singular* to the common Place of the Whole and its parts.

Another Affection of *Ens*, is *Finite* and *Infinite*. *Finite Beings* are ſuch as are contained in certain determined Bounds and Limits; as all the *Creatures* which are ſaid to be *Finite*, either in regard of their *Number*, *Quantity*, *Duration*, *Perfection*, or *Eſſence*.

Infinite is that which is contain'd or comprehended in no Bounds, and is only *God*, who is ſaid to be in all thoſe reſpects wherein the *Creatures* are Finite, and more if there be any.

And thus we have done with the general Part of *Metaphyſicks*; We come now to ſpeak briefly of the Special, which treats of *Subſtance* and *Accidents*.

Subſtance is a *Being* which ſubſiſts by it ſelf, and is not in any other thing as in its Subject; and it is either *Compleat*, or not *Compleat*.

Compleat Subſtances are either *Finite*, or *Infinite*. *Finite* are either Corporeal, as *Body*; or Incorporeal, as *Angels* and *Spirits*.

Infinite is only *God*.

An *Accident* is that which is in another thing, as in its Subject; and it is either *Primary* or *Secondary*.

Primary

Primary Accidents are either *Quantity*, *Quality*, or *Relation*.

Secondary Accidents are either *Abſolute*, or *Relative*.

Abſolute, as *Quality*, which contains *Action* and *Paſſion*; and *Quantity*, which contains *When* and *Where*.

Relative, as *Situs* or Situation, which ſignifies the diſpoſition of Parts in order to Place; and *Habitus*, which ſignifies thoſe things which are adjacent and near to any Body.

And thus I have finiſhed this ſhort Tract of *Metaphyſicks*, wherein I have for Method in moſt things obſerved the Ancient Philoſophers; but in Difficulties, thoſe whom I judge to have the moſt Reaſon.

MORAL

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MORAL PHILOSOPHY.

MORAL PHILOSOPHY, or ETHICKS, is that which teacheth Men to live well and happily according to Vertue: It is commonly called that Part of *Philosophy*, which Instructs and Regulates our *Manners*; and thence it hath its Name, both in *Greek* and *Latin*. *Manners* are the frequent iterated Actions of Human Life, whence at length *Habits* are produced either Good or Evil.

It hath been often controverted whether *Moral Philosophy* be an *Art*, or a *Prudence*, or a *Science*; but the most Learned of our Modern Authors conclude it to be a *Science*; for an *Art* they say it can't be, because *Arts* are only conversant about *Corporal Actions* and *Things*: And though it be true, that *Liberality*, *Temperance*, *Justice*, &c. are referred to *External* and *Corporal things*, yet *Moral Philosophy* is only concerned about the Relation which the *Mind* or *Will* hath to those *Actions*.

Again, a *Prudence* it can't be, because *Prudence* is only found (according to its Definition) in good Men, whereas the Dicipline of *Moral Philosophy* may be in the worst men living, as well as Craft or Subtilty of Mind. Like *Medea* they may know and approve those things which are good, and yet in the mean while be stark naught themselves.

Furthermore, *Prudence* consists in a deliberation about the single Actions of our Lives, according to their present Circumstances; but *Moral Philosophy* is constant, of undoubted Truth and of certainty, and concerns all our Actions; as for Example, It is not at all doubted, nor can it possibly be the Subject of a Dispute, Whether or no we are to give every Man his own.

In short, That it is a *Science*, appears from the Definition of *Science* it self; which is this,

That is properly said to be a *Science*, which teaches any thing certainly and evidently from true Principles; and such is *Moral Philosophy*, whose Discipline is always founded on the Acting according to right Reason.

The proper and adequate Object of *Moral Philosophy* are *Human Actions*, as they may be directed to a *Moral Good*, or an End agreeable to right Reason; where by Human *Actions* we are to understand, the free and voluntary Actions of the Mind.

It is defined to be a *Science*, directing Human *Actions* in order to a happy State of Life.

Now whereas a Man may be considered singly and as a private Person, as a *Husband*, *Father*, or *Master* of a Family; and likewise in his relation to the Publick, the parts of *Moral Philosophy*, in regard of these three several Capacities are also three; which we call *Ethick* or *Monastick*, *Oeconomic* and *Politick*.

The *Ethick* or *Monastick part*, which is the principal, is again divided into three parts, whereof the first Treats of the *End* of *Human Actions*, which is *Happiness*; The Second of the *Principles* of *Human Actions*; And the last of the Actions themselves; and likewise of the *Passions*, *Virtues*, and *Vices*.

We shall begin with the first, to wit, the end of *Human Actions*, or Good in general.

Good is defined to be that which all Things desire or seek, as it appears good, or convenient to their Natures.

It hath been a great Question in the *Schools*, Whether any thing that is evil in it self, can be the Object of Appetite. To which we Answer with this Distinction, That Good is either real or apparent, and that which is really evil or dishonest, may be represented unto us as Good, under the notion of Profit or Pleasure; and so become the Object of our Appetite or Desire, but yet we desire it not as evil, but under the shew, or appearance of Good.

The most ordinary and best Division of Good is into *Honestum*, *Utile*, and *Jucundum*, which may be thus rendred into English.

Honour, *Profit*, and *Pleasure*.

And every one of these are the proper Object of Appetite or Desire, and the end of *Human Actions*.

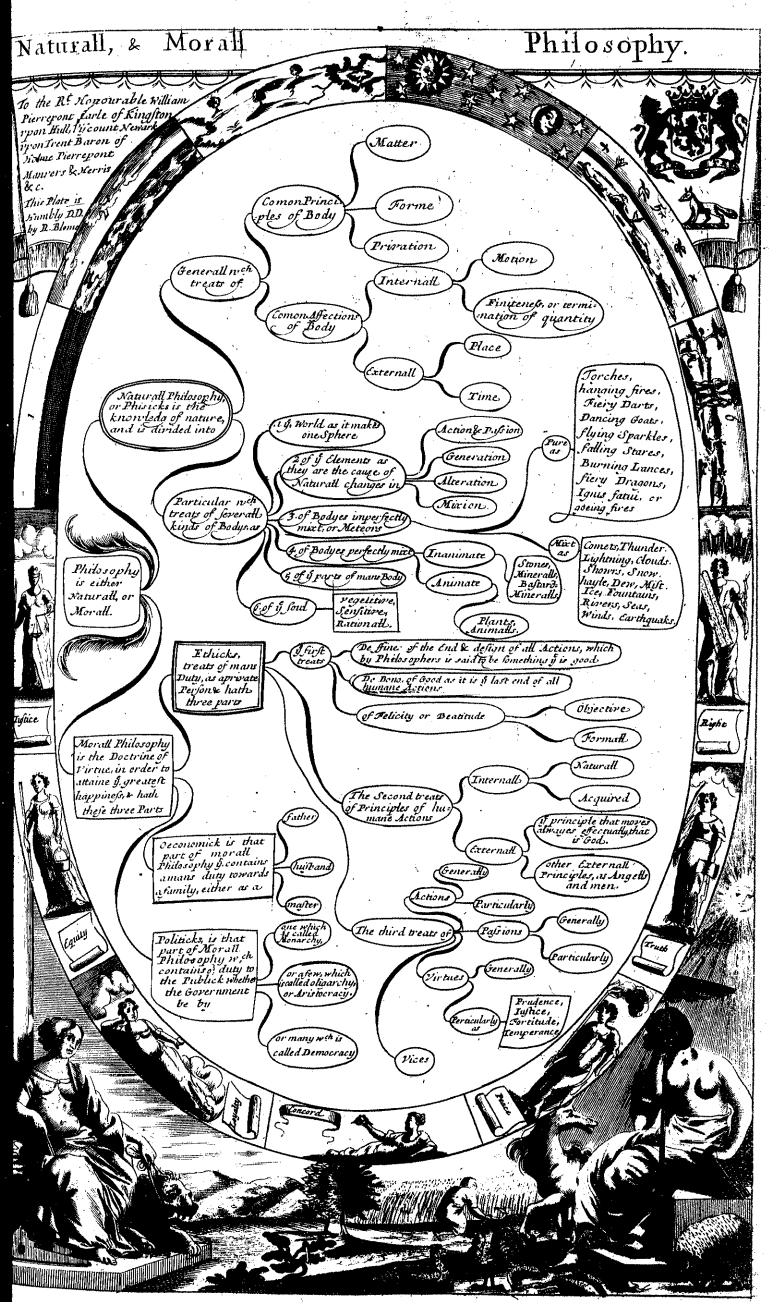
And here ariseth a *Question* amongst our *Moral Philosophers*, Whether Good and the End be one and the same thing. To which is Answered.

1. That they are not formally the same, because Good is defined, That which is convenient: But the *End*, that for whose sake any thing is done.

2. They are not the same, because they are not reciprocally converted; for though every *End* or design of an Action be some *Good*, yet every *Good* is not the *End*.

3. But yet they are Potentially the same; for every thing that is good may be the *End* of Human Actions, as certainly, as that every *End* is good.

And here they enquire again, Whether every thing in the World acts for an End or not. To this it is answered with this Distinction, That to act for an End may be considered either as it is known, with the means that leads to it, or as it is not known. As the End is not known, so every thing in the World (as well as Man) acts for


Naturall, & Morall Philosophy.
To the Rt Honourable William Pierrepont Earle of Kingston upon Hull, Viscount Newark upon Trent Baron of Holme Pierrepont Manvers & Merrit &c.
This Plate is humbly D.D. by R. Blome
Matter
Forme
Priviation
Motion
Internall
Finitenes, or termination of quantity
Place
Externall
Time
Comon Principles of Body
Generall wch treats of
Comon Affections of Body
Naturall Philosophy in Phisicks is the knowledg of nature, and is divided into
1. of World as it makes one Sphere
2. of 5 Elements as they are the cause of Naturall changes in
3. of Bodyes imperfectly mixt, or Meteors
4. of Bodyes perfectly mixt
5. of 5 parts of mans Body
6. of 5 soul
Particular wch treats of severall kinds of Bodys as
Action & Passion
Generation
Alteration
Motion
Pure as
Mixt as
Inanimate
Animate
Vegetative, Sensitive, Rationall.
Stones, Minerals, Bitumes, Mineralls
Plants, Animals
Torches, hanging fires, Fiery Darts, Dancing Goats, flying Sparkles, Falling Stares, Burning Lances, fiery Dragons, Ignis fatui, or goeing fires
Comets, Thunder, Lightning, Clouds, Showrs, Snow, Hayle, Dew, Mist, Ice, Fountains, Rivers, Seas, Winds, Earthquake
Philosophy is either Naturall, or Morall.
Ethicks, treats of mans Duty, as aprvate Persone hath three parts
1. wch treats
Be fine. of the End & design of all Actions, which by Philosophers is said to be something y is good.
Or Bons. of Good as it is y last end of all humane Actions.
of Felicity or Beatitude
Objective
Formall
Morall Philosophy is the Doctrine of Vertue, in order to attaine y greatest happiness, & hath these three Parts
The Second treats of Principles of humane Actions
Internall
Naturall
Acquired
Externall
A principle that moves allmoves & equally that is God.
other Externall Principles, as Angells and men.
Oeconomick is that part of Morall Philosophy y contains y mans duty towards a family, either as a
Father
Husband
Master
Generally
Particularly
Actions
Particularly
Generally
Passions
Particularly
The third treats of
Politicks is that part of Morall Philosophy wch contains y duty of the Publick whether the Government be by
one which is called Monarchy
or a few, which is called Oligarchy, or Aristocracy
or many wch is called Democracy
Vertues
Generally
Particularly as
Prudence, Justice, Fortitude, Temperance
Vices
Justice
Equity
Truth
Right
Concord
Peace

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for an End, becauſe there is always ſome End, and means are known, ſo nothing but a Rational Creature can be ſaid to act for an End.

To conclude this, there is always ſome ultimate and abſolutely laſt *End* of all human *Actions*; and that is *Beatitude*, or *Happineſs*, which every one propoſes to himſelf, though their Opinions of that *Happineſs* be different, ſome placing it in *Riches*, others in *Honour*, and ſome in *Recreations*, and the like

And now we come to ſpeak of *Beatitude* or *Happineſs* it ſelf, which is the chief Good, or laſt *End* of *Man*; and that is Twofold, *Objective* and *Formal*.

Objective Beatitude or *Happineſs*, is that Object or thing that makes us happy, which is ſomething without us; and *Formal Beatitude* is our own Enjoyment of that Happineſs, or the way of its being Communicated to us, and that is within us.

And hence it follows, that this Objective *Beatitude* is ſomething more excellent and Noble than Man himſelf; becauſe it is that which makes him happy. And this is the very ſame thing with the laſt End of all our Actions.

It will be our next buſineſs to determine wherein this *Objective Beatitude* does conſiſt; and,

1. Negatively we ſay it does not conſiſt in outward good things, thoſe which we call the *Goods* of *Fortune*; and that becauſe they do not ſatisfie the Appetite.

2. Becauſe they are not deſired for their own ſakes, but for their uſe; becauſe they are Subſervient only to the more ignoble part of Man, to wit his *Body*; Becauſe they are not in our own power, that is, they are many times taken away from us againſt our Will; And laſtly, becauſe many of them, as *Honour*, *Praiſe*, *Glory*, &c. depends oftimes upon the falſe and miſtaken Opinion of the World, and many times on meer Flattery.

3. Again, it does not conſiſt in the *Goods* of the *Body*, as *Beauty*, *Strength*, or the like, nor yet in the Pleaſures of the *Body*, as *Recreations*, &c. Becauſe they are things not deſirable for their own ſake, but as they are referred to the *Soul*; Becauſe they are not in our power, for we are not *Strong*, or *Beautiful* or *Healthful* as we pleaſe. To this may be added, that theſe things are common to *Beaſts* as well as to our ſelves.

4. And laſtly, this *Objective Beatitude* is not placed in the good things of the *Mind* or *Soul*, that is, in the excellent *Faculties*, *Habits*, or *Operations* of it.

It cannot be in the Faculties, or Habits of the Mind, becauſe thoſe are not deſired, or ſought for themſelves; but for ſome other thing, to wit in order and for the ſake of the Operation of thoſe Habits, and the bringing them forth into *Act*. And then again it cannot be in the Operations themſelves, becauſe thoſe *Actions* and *Operations* are in Man himſelf; and this Happineſs or chiefeſt Good we are ſpeaking of, muſt needs be without him, and of a more Noble Nature than he is.

To conclude therefore, that God alone is the *Objective Beatitude*, or chiefeſt Happineſs of *Man*, and the great end of all his *Actions*; becauſe in him only are found the moſt excellent Conditions, and he only can ſatisfie our wiſhes and deſires.

This *Objective Beatitude* that we have hitherto been ſpeaking of, is without the Man, we come now to ſpeak of the *Formal Beatitude* that is within a Man, and is really found in him who is truly happy. Let us ſee now in what part or Faculty this *Formal Beatitude* is placed.

This *Beatitude* then is in the Mind; becauſe there can be nothing in the Body to deſerve it, eſpecially when we conſider that the *Body* is wholly ſubſervient to the Mind.

Now whatever is in the *Soul*, is either a Power which is natural to it and inbred in it, or a *Habit*, which is acquired by the Repetition of many ſingle Acts, or elſe the *Act* and Operation it ſelf.

In neither of the two former we know it can be placed, becauſe they are only deſirable, not for their own ſakes, but only for the *Act* and *Operation*; whence it is plain, that this *Formal Beatitude* muſt needs conſiſt in ſome excellent Operation of the Mind. And hence by *Boetius* it is deſcribed to be *A State perfect by the Aggregation of all good things*. Now to entitle any Man to this Happineſs, it is not abſolutely neceſſary that he ſhould be always occupied in theſe Operations; but it ſuffices that he be converſant in them, ſo often as his Reaſon judgeth meet, and human Infirmity will permit.

We aſſert again, that this *Formal Beatitude* muſt be placed in that Operation of the Mind, by which (as far as our condition in the World ſuffers us) we enjoy that *Objective Beatitude* before ſpoken of, to wit *God Almighty*. Now that Operation of the Mind is Twofold, the Contemplation of him, and the Love of him. And that this Operation of *Mind* conſiſts in contemplating on him, and in loving him both together, but in neither ſingle or alone, is proved, In that the fruition or poſſeſſion of the chiefeſt Good, conſiſts in being united to it; and hence it is that not Contemplation, but a moſt firm and conſtant Love is required in this Operation. For as Contemplation excites and ſtirs up *Love*, ſo *Love* promotes and helps Contemplation. For the oftner we think on any thing that is good, the more vehemently we love it; and the more we love any thing, the more we think upon it.

Again, becauſe the *Operations* of the *Mind* do very much depend upon the habitude, or good diſpoſition of the *Body*, it is alſo neceſſary that the *Body* be in Health, or at leaſt free from ſuch *Diſeaſes*, as by their grievous pains may hinder the mind from theſe Operations. The like may alſo be ſaid of outward good things, as *Riches*, &c. For he who is always employed in getting what is neceſſary to ſuſtain Nature, muſt needs want leaſure to attend on Divine Love and Contemplation.

And laſt of all, *Vertue*, or the Exerciſe of *Vertue*, is not properly ſaid to be this Felicity or Operation, but rather is referred to it. This Felicity conſiſting in Contemplation; and the Exerciſe of Vertue is only in outward Actions.

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Thus much of Natural *Felicity*, or *Beatitude*. *Supernatural Beatitude* consists likewise in the clear Vision of God, and a perfect Love towards him; but that is proper for *Theology*.

We are now come to the second part of *Ethicks*, or *Moral Philosophy*, which Treats of the Principles of Human *Actions*, which are either *Internal* or *External*.

Again, the *Internal Principles* of Human *Actions* are either such as are Natural, and inbred Faculties of doing any thing; and these are called *Powers*; or such as are acquired by *Exercise* and *Action*, and they are called Habits.

Those which are natural to us, and born with us, are the *Understanding* and the *Will*; and to these two both the *Phantasy* and the *Sensitive Appetite*, (and if there be any other in ward Principle of our Actions) may be reduced.

The Understanding moves the *Will*; for it is certain there can be nothing in the *Will*, which was not first in the *Understanding*; and then again the *Will* moves the *Understanding*, for we find we can easily consider of any thing as we please, and let it alone again when we please.

And now let us see how the Interior Powers or Faculties are moved by the *Will*, and what command she hath over them. And yet we must take notice (here by the way) that there are some of the Inferiour Powers of the *Soul*, that are in no ways under the command of the *Will*; for Example, the Faculty of *Vegetation* or growing is perfectly without the Power both of our *Will* and *Reason*.

The *Will* moves the inward *Senses*, which are *Common Sense*, *Phantasy*, and *Memory*, but not absolutely, and altogether as it pleases; for they are in a great measure at their own liberty, and many times are contrary, and refractory both to the *Will* and *Reason* also. But the *Will* moves the outward Members in their Natural and proper *Motions*, just as she pleases, without any Resistance at all. Whence it is plain, That the *Memory*, *Phantasy*, and *Common Sense* are much freer, and more at their own Liberty, than the *Locomotive Faculty* is, which seems to be wholly in the Power of the *Will*.

The other sort of *Internal Principles* are *Habits*. A *Habit* is defined to be a Quality or Disposition of the Subject; which gives it not the first Power of Acting, but makes it Act more easily and steddily; and remain in the Subject, though the Action it self be absent.

And we may observe that this Definition distinguishes Habit from Natural Power, because it is said Habit gives not the first Power; and also from these *Habits* which are not Operative, or produce no Action, as *Beauty*, *Strength*, &c.

And lastly, it distinguishes it from the *Action* it self; because it remains in its Subject, to wit the *Soul* when the *Action* is not present.

Habits are gotten, or produced by the Repetition of many single *Acts*; but those *Acts* must always be of the same Power, or faculty of the *Soul*, wherein the Habit is produced.

Thus *Prudence* being an *Intellectual Habit* can't be acquired but by Acts of the Understanding. And *Justice*, *Fortitude*, and *Temperance* being in the *Will*, can't be attained unto but by the Acts of the *Will*.

Some have been of Opinion that *Habits* are begot by the first single Actions; and that all the Subsequent Actions do but serve to confirm and strengthen the *Habit* already begot. Others think the *Habit* acquired by the last *Action*, and that all the former did only dispose the *Power*, or *Faculty* of the *Soul* to receive the *Habit*; But it is not probable that every single *Action* contributes something towards the acquiring of the *Habit*.

Again, no *Habit* can be increased but by more intense *Actions* than those by which it was gotten; whereas it is weakned by those Actions which are more remiss, and only cherished and kept in the State it is by those *Actions*, which are just equal to those which produce it.

There are others of Opinion that *Habit* is a great help to that Faculty of the *Soul* in which it is, as to its ready and easy Operation; but deny that *Habit* is it self alone a Real Principle of Action, since the Action wholly proceeds from the Faculty. To which we Answer, That a piece of Work may depend at the same time both on the *Tool*, and the Hand of the *Artificer*. And so may any *Action* both be Attributed to the Faculty, which immediately performs it, and also to the *Habits* ready and easy Disposition of the Faculty, so that we conclude it to be a True and Real Principle.

Habits are Corrupted and Destroyed, either by the Destruction of the Subject they are in (as well as all other Accidents); if either the *Soul*, or the Faculties of the *Soul* Perish, it is likewise certain all the *Habits* in it must Perish; and also they are sometimes utterly expelled by their Contraries, their Subject remaining still whole and Entire. For Instance, The *Habit* of *Justice* may be quite expelled, and banished out of the Will by Acts of Injustice.

But the great Difficulty is whether a *Habit* of Virtue can be utterly destroyed by a bare Cessation, or forbearing the Exercise of it.

Some Distinguish very subtilely (but I know not how well) That it may, as to its use, but not as to its Substance. And indeed if we search the matter to the bottom, we shall find that 'tis very hard to conceive how the bare Cessation should utterly destroy the *Habit*; but when Sloth and Idleness lulls it asleep, the Appetite gets new Strength, and so the contrary *Habit* destroys the former; though it seem to perish of it self, by a bare Cessation of Operation.

And hence it is that the Ruine of good and vertuous *Habits* is commonly attributed to Sloth, which indeed doth really proceed from the Prevalence and Increase of the contrary *Vice*.

Thus far of *Inward Principles*. We shall proceed next to the *Outward Principles* of *Human Actions*. And first of that *Principle* of *Human Actions*, which always moves Effectually, and that is *God*.

And here we must know that God is not only the *External Principle* of *Human Actions*, as the Final Cause is, (that is, as he is that Objective Beatitude, and End of all Actions); But also the *Efficient Cause*. And that either as he is the Universal Cause of all things, and works in us both *to will*, and *to do*, or as he Influences and directs that Principle of choosing, which he hath planted in us. In either Sense he may be said to be the External Principle of our *Actions*.

That *God* is the Principle of our Actions, in the first Sense is evident, because he Governs and Orders all other second Causes as he pleaseth; and in the Former Sense, likewise is plain from this Argument. That which stirs up the most inward and near Cause of Action to act, is the Outward Principle of the *Action*. But God does so. Therefore it must be so.

And this he doth two several ways, either by concurring with our Freedom of Will, or else Moving and Inclining our Will to this or that thing. And first God concurs, as the first Cause with the second to produce the act, by this means making up as it were one Entire Cause.

But yet we are told that this general Influence or concurrence of God Almighty, doth not produce the Effect with the concurrence of the Second Cause too, which is our Will. Whence we may learn by the way, That Gods general Concurrence as the first Cause, lays no Fatal Necessity upon our Actions, since the Will is still Free, and Indifferent.

And now we come to speak of Gods moving the *Will* to *Act*, besides the Univeral Concurrence we have spoken of. And in this there is more Difficulty, because the *Will* seems to be determined by God, before she hath made her own choise.

The *Schoolmen* salve this Difficulty thus, They say that God moves second Causes with such a Motion as is convenient, or agreeable to their Natures; Now since the *Will* is a Faculty not determined to one thing, but indifferently can make choise of any; *God* doth not move it with such a necessity, as doth determine it to one thing, by which means its Motion remains still Contingent and not Necessary. The words are *Thomas Aquinas*. But we believe that God moves our *Wills* sometimes irresistably, and necessarily; For I do not think that St. *Paul* or *Mary Magdalen* (though they would never so fain) could have withstood their own Conversion.

There are some other Outward Causes, which sometimes move our *Wills*. As the *Persuasions* and *Arguments* that Men may make use of, &c.

So likewise *Angels* either good or bad, may by changing the Phantasie, move the *Will*. And this may be done not by producing any new *Phantasm*, which was not in the Brain before; but by stirring and moving the *Spirits* and *Humours* which reside there; and so bring to their Mind some past *Species* or *Images*.

This they may possibly do likewise by changing the Sense, and that these two ways, *viz.* by moving of the *Spirits* in the *Brain*, and after bringing them into the Organs of Sense; or else by some change of Disposition of the outward Object.

We come now from the Principles of Human *Actions*, to the *Actions* themselves, where we shall also treat of the *Passions*, *Virtues*, and *Vices*.

Philosophers do not call all the Actions of Man *Human Actions*; but only those that proceed from a Free Principle of *Acting*, which is the *Will*. Hence is that Division of *Actions* into *Voluntary* and *Involuntary*.

First then, *Voluntary* is taken largely, for that which we call Spontaneity; and is defined to be a *Principle* in the *Agent*, which knows the thing about which it Acts. And here it is required that the Principle of Acting be in the *Agent* it self; and likewise that it be carried towards the Object, with some sort of Knowledge. And therefore those things which have the Principle of Acting in themselves, but no Knowledge of the Object, are said to act Naturally, but not Voluntarily. And hence we have that common Description in the *Schools*, of an Action into *Spontaneous*, *Natural* and *Violent*.

A *Spontaneous Action* hath the Principle of *Action* in it self, with some Knowledge of the *End*. The *Natural* hath in it the *Principle* of *Action*, but no Knowledge of the *End*. And the Violent hath ever the Principle of the Action Separate from it, as when a Stone is cast upwards.

Again, if we take *Voluntary* strictly, and properly, it is only found in *Man*; and may be defined, A *Principle* in the *Agent* with perfect knowledge of the End, such as is not found in *Beasts*.

Now we must remember, that there is a Perfect, and an Imperfect Knowledge. The Perfect is when the *End* is known, and the way likewise by which the means lead to the End; and this is found only in *Man*, and is the *Voluntary* that we are here speaking of. The other is imperfect, when the *End* is in some measure known; but the Reason and Proportion of the Means, which conduct to the End is not, and this is found in *Fools* and *Children*, as also in *Beasts*.

That which is Voluntary, and the product of our *Wills*, in this case one would think should be always free (speaking properly:) And yet we find it is not; for though the *Will* in Man can't be compelled or constrained, yet it may be necessitated: As for Example, To *Will* that which is Good is necessary and natural to us, and so in this sense is not free. So that we see, that to *Will*, and at the same time to be Necessitated, may consist together.

Lastly, These *Actions* of the *Will*, or what we call *Voluntary*, are said to be deliberate; not that the *Will* it self deliberates, but that it follows the Guidance and Direction of the *Understanding*, which it has well deliberated.

Involuntary in its largest sense is opposed to *Spontaneity*; but in the stricter sense it is either through *Violence* or *Ignorance*. Through *Violence*, as when a Man is carried whether he would not go; through *Ignorance*, when through some default in his *Judgment* or *Reason*, he does that which afterwards he repents of.

The most common division of *Ignorance* is into *Vincible* and *Invincible*.

In-

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Invincible is such, as with all diligence and industry could not have been avoided; But *Vincible* is such, as if care and pains had been taken, might. And it is the former of these two which makes an *Action* Involuntary.

Here *Moralists* enquire, whether nothing else but *Violence* and *Ignorance* make an *Action* Involuntary. The greatest Question is of *Fear* or *Desire*, whether they do not do the same thing: For Example, When a *Man* to save his life in a Storm by Lightning the *Ship* casts his Goods over-Board; it is questioned, whether this *Action* be *Voluntary*, or not?

It is Answered, That such *Actions* as these are partly *Voluntary*, and partly *Involuntary*. *Involuntary* they are, if you consider them simply and in themselves; but *Voluntary*, if you consider them with their circumstances: for the *Man* was willing to lose his Goods rather than his Life.

Thus far of *Actions Voluntary* and *Involuntary*; We are now to discourse of the *Goodness* or *Badness* of *Actions*

The *Goodness* of an *Action* is the conformity of it with right Reason, and the *Badness* of it is its deformity or alienation from Right Reason: I call *Right* a good Mind, free from all Fantastick Opinions, knowing the Laws of *God* and *Nature*, and making a prudent Judgment of the Action to be done, according to the intent of the Law.

And this makes a vast difference betwixt one and the same *Action*, which *Physically* and *Naturally* considered hath no difference at all. As for Instance, To kill a *Man* by private Authority is an *Evil Action*; but to do it by publick Authority makes it *Good*, though the Action in it self absolutely considered is the same.

The Goodness or Badness of the *Action* is taken from the goodness or pravity of the *Will*, for the most part: But *Actions* may sometimes likewise be said to be good or bad according to their *Object*, their *End*, and their *Circumstances*.

And though it may be here objected, That nothing can be the Object of the *Will*, or the End of the *Willing*, but that which is *Good*; yet we must still remember, that Good is so really or apparently, and when only an apparent Good, it is a real and an absolute Ill. Thus, that which seems *Good*, as it hath either Profit or Pleasure in it, may yet be *Evil* in its deformity or digression from *Right Reason*, and so may neither deserve Praise nor Reward, and by consequence not be *Bonum honestum*, that is, an *Honest Good*, which is one Branch of the division of *Good*.

The last Question about the *Goodness* or *Badness* of *Humane Actions* is, they be all necessarily either Good or Bad, and whether some of them be not Indifferent.

And to this may be Answered, that many Humane Actions, as *Walking*, *Sitting*, *Standing*, and the like, are certainly in their own nature Indifferent; but as they are refer'd to any *End*, they must needs be either *Good*, or *Bad*; that is to say, as they regard this or that *End*, they are, or are not conformable to Right Reason.

The next thing which *Philosophers* consider in Human Actions is the *Circumstances*, that is, those things which are placed, or stand about the Actions. They are generally reckoned in this old Verse,

Quis, Quid, Ubi, Quibus auxiliis, cur Quomodo, Quando.

That is, the *Person* which doth the Action, the *Action* it self, the *Place* where, the *Helps* with which, the *Reason* why, the *Manner* how, and the *Time* when.

Here note, that the *Circumstances* many times add very much either Good or Bad to the *Action*, nay, sometimes they change the very nature of it; as the Stealing any thing dedicated to Holy uses makes the Offence *Sacriledge*, which otherwise would have been but simple *Theft*.

Thus of *Human Actions* in general; Now of the *Species*, or several kinds of them.

The ordinary and common division of *Human Actions* is into *Elicite* and *Imperate*; By *Elicite* is to be understood those Actions whereof the *Will* her self is the first Principle, and produces them in her self. By *Imperate* we mean Actions of which the *Will* is not the first Principle, which yet are not done without the Power or Jurisdiction of the *Will*.

The *Elicite* Actions of the *Will* are either about the End or the Means.

Those about the *End* are these three; *Volition* or *Willing*, *Fruition* and *Intention*.

Those about the *Means* are also three; *viz. Election*, *Consent*, and *Use*.

And now because our *Passions* have a great influence upon our *Actions*, in making them either *Vertuous* or *Vicious*, it will be convenient to speak something of them both generally and particularly, before we come to speak of the *Vertues* and *Vices*.

The Spring or Fountain of the *Passions* is the *Sensitive Apperite*, which (though it be found as well in *Beasts* as in *Men*) we speak now of it as it is peculiar to *Men*.

The *Sensitive Appetite* is either *Concupiscible* or *Irascible*, and it is necessary it should be so, for the seeking that which is good and convenient, and avoiding of that which is hurtful; and in these two are founded all the *Passions* of the *Mind*.

A *Passion* of the *Mind* is defined, to be a Motion of the *Sensitive Appetite* from the Apprehension either of *Good* or *Evil*, with some unnatural change of the *Body*, *Good* or *Evil*, that is, as it seems or appears.

They are called *Motions* in distinction to the other Faculties of the *Soul*, which are either *Powers* or *Habits*. *Powers* they can't be, because they are not always ready like other *Powers*, to be produced into *Act*; And *Habits* they can't be, because they are many times stirr'd up before any Habit of them is gotten: And they are called *Passions*, because both *Soul* and *Body* suffer by them.

The *Stoicks* were wont to number but four of them, to wit, the Passion of *Joy*, *Sorrow*, *Hope*, and *Fear*; But the *Peripateticks* have made them by Subdivisions Eleven, attributing Six to the *Concupiscible*, and Five to the *Iracible* part of the Sensitive

Sensitive Appetite. The Six first are *Love*, *Desire*, *Joy*, *Hatred*, *Flight* or *Avoiding*, and *Sorrow*. The five last are *Hope*, *Despair*, *Fear*, *Boldness*, and *Anger*.

That *Passions* are not all *Vitious* or Blameworthy, appears in that Good Men, as well as Evil do *Love*, and *Fear*, &c. Again, no Man can commit a Fault, but with his *Will*, and *Passions* sometimes can't be avoided though we would. And then again, because Vertue is conversant about the *Passions*, as about its proper Subject; It would follow, that he who wanted *Passion*, must needs want *Vertue* also; and thus it appears, that every *Passion* is not Evil.

And now we come to speak of the *Vertues* and *Vices* in General; and first of Vertue in General.

Vertue is defined to be an *Elective Habit*, consisting in a Mean, which prudent Men judge, and make use of in all their Actions.

Vertue is an *Habit* of the Mind, which consists in a *Medium*; and there are two sorts of it; the one proper to the Understanding, as *Prudence* and *Wisdom*; and the other proper to the *Will*.

Vertue is said to be a *Habit*, that's the *Genus*, under which it is comprehended, as well as *Vice*.

It is said to be Elective, to distinguish a *Moral Habit* from an *Intellectual Habit*.

We say it consists in a Mean, to distinguish it from *Vices* which do not; for though *Vices* may truly be said to be *Moral Elective Habits*, yet they offend always either in Excess or Defect, (which Prudent Men judge and make use of in all their Actions:) This is inferred in the Definition, to inform us that Men must judge of their *Actions*, and the mean spoken of, according to the Rule of right Reason. And this Definition agrees with every *Moral Habit*, except it be *Prudence*, and that is rather an Intellectual one.

It is here questioned Whether Vertue consists in the Mean, or Middle place, between the two Extreams, which are both *Vices*. The Answer is, That all *Moral Vertue*, except *Justice*, consists in the Mean, or middle between two vitious *Habits*; As *Liberality* between *Prodigality* and *Covetousness*; *Fortitude* between *Cowardness* and *Foolhardiness*; so *Prudence* it self between a *Crafty Slyness*, and *Folly* or *Ignorance*.

But *Justice* must always be excepted; for whatsoever either exceeds, or falls short in it, is *Injustice*, and so Injustice is alone and on either side opposed to Justice. And yet the Vertue always comes nearer one of the extreams than the other, because one of the extreams is always nearer to right Reason.

All the *Moral Vertues*, except Prudence (which is not purely so) are seated in the Rational Appetite, that is, in the *Will*; Because all *Moral Vertues* being *Elective Habits*, must needs be in that Faculty or Power of the *Soul* which makes the Election, and that is the *Will*.

The *Cardinal Vertues* (so called, because all other Vertues turn upon them as Dores do upon their Hinges) are these Four; *Prudence*, *Justice*, *Temperance* and *Fortitude*.

Prudence hath a particular reference to the *Reason*, *Justice* to the *Will*, *Temperance* to the *Concupiscible Appetite*; and *Fortitude* to the *Irascible*.

It is a generally received Opinion amongst *Moral Philosophers*, That he that hath one *Vertue* hath them all; And it is thus proved, Every one carries along with it *Prudence*; and *Prudence* can't be destitute of all the other *Vertues*, and hence we conclude, That the Vertues are tied together in one common Bond.

Prudence, which is the Governess of all the other *Vertues*, is defin'd by *Aristotle*, To be a Habit of acting with right Reason, about those things either good or bad for a Man.

The Subject in which it is, is the *Understanding*, and therefore properly it is an intellectual *Vertue*; But the Object about which it is conversant, is *Human Action* in general, or whatever is to be done.

The general Office of *Prudence* is to dispose the Means in order to the End; that is, to direct other *Moral Vertues* about fit Means to attain their Ends, which is done these three ways.

By finding out fit and proper Means, and this is called *Invention*.

By making choise of those which are most proper, and this is called *Judgment*.

By teaching and instructing us in the use of them, and this is called *Government*, or *Command*.

The Integral parts of *Prudence* are the Memory of things past.

The Knowledge or Understanding of things present.

And providing for the Future.

Prudence is a Vertue which consists in the knowledge of Truth, with a quickness of Apprehension, so that it requires a diligent search, and a certain Knowledge of what is true: for according as any one is apt to discover what is most true in any thing, and to find it out with great Sagacity, and withal to give a Reason for it, the same is commonly and deservedly called a wise and prudent Man: Then Truth is the subject he applies himself unto, and to take right Counsel in order to do what is good, and conducive to a happy life; and such a Uniformity should be kept in all our Actions, that all the *Passages* of our Life may agree together.

Justice, which is termed the Queen of all *Vertues*, tends to the conservation of human Society, by giving every one his due, and justly observing all *Contracts* and *Bargains*, not doing Injury to any; but to do as you would be done unto.

It hath its Name from the Latin Word *Jus*, which signifies to do that which is required by the Law both of *God* and *Man*.

It is either *Universal* or *Particular*. *Universal Justice* is that which respects our Duty in order to the conservation and good of the Publick, and the Notion of this Justice is as large as that of *Vertue* it self.

Particular Justice is that which regards our Dealings with privat Persons, and is either *distributive*, or *commutative*.

Distributive Justice is the giving every Man his due, both as to *Rewards* and *Punishments*, &c.

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Commutative Justice is the doing right in *Contracts*, in *buying*, *selling*, *exchanging*, &c.

The former of these belongs properly to the *Prince*, and the latter to the People one amongst another.

And here we can't without a breach in our Method, omit to say something of the *Law*, which is the Standard, and Rule of Justice, and from whence it is said to receive its very Name.

Law is a System of *rational Precepts*, shewing Men what they are to do, and what not, in order to the Publick Good.

There are Three things necessary in a *Law*, (1) That it be just, and according to right Reason. (2) That it be made by those that have Authority, and to whose care the Publick Good is committed; And (3) That it be lawfully promulgated, or proclaimed, or else it doth not oblige.

Law is divided into *Human* and *Divine* (which is properly the business of *Theology*).

Human Law again is either *Civil* or *Ecclesiastick*.

Civil is that which is in the Power of the *secular Magistrate*, considered meerly as such. *Ecclesiastical* is that which is administred by the Church, either as to *Doctrine* or *Discipline*.

The Effect or consequent of the Law is Right; that is to say, a Reward proportioned to the merit of the Fact; And so the *Law*, the *Fact*, and the *Right* makes up a demonstrative *Syllogism*. Thus.

Every *Murtherer*; ought to be punished there is the *Law*.

Milo is a Murtherer there is the *Fact*.

Therefore *Milo* ought to be punished, and there is the *Jus* or *Right*.

Justice is also twofold; the one relates to God, and the other to Men; the first is called *Religion* or *Piety*, whereby we pay to God the Religious Duty we owe unto him; Opposite to which are these two Vices, Superstition and Irreligion, each of them odious in its kind. The Justice that relates to Men, is either Universal, which gives us the Character of Good Men; or particular, and this is either Distributive or Corrective Justice. In this *Distributive Justice* must be considered *Fidelity* and *Gratitude*, as amongst these several Relations of *Subjects* to their *Princes*, and *Princes* to their *Subjects*; of *Parents* to their *Children*, and *Children* to their *Parents*; of *Wives* to their *Husbands*, and *Husbands* to their *Wives*; *Brothers*, and *Sisters*; *Masters* and *Servants*; *Benefactors*, and such as have received any Kindness from them; And as we ought to be just and equitable to all Men, so we are more especially bound to do Good for Good, and to retaliate Kindnesses.

To *corrective Justice* belongs the punishment of *Crimes*.

Fortitude is a certain constancy of Mind, both in undertaking Dangers, and performing Labours. It is sometimes said to be the Seasoner of all the rest, for unless a Man be endued with this Constancy of Mind, it can scarce be expected that he should stick close to his Duty, when once it comes to be separated from his Interest.

It is either *Active* or *Passive*, as you see in the *Definition*; Active in undertaking great and difficult things, and *Passive* in suffering the like. The Integral Parts of them both are *Magnanimity or Greatness of Mind*, *Patience*, and *Perseverance*.

Temperance may in general be said to be any *Vertue* which observes a mean in moving of the Mind; But especially and most properly it is that Vertue which is concern'd in moderating our Pleasures, that is, the sensual Pleasures of the Body. There are three *Acts* peculiar to it, (1) Avoyding all excess in *Meat*, *Drink*, &c. (2) Directing us in the use of them, (3). Seeking what is necessary, to wit, *Meat*, *Drink*, &c.

The *Subjective parts* of this Vertue are *Abstinence*, *Sobriety*, *Chastity*, and *Modesty*.

And thus considered it will direct us also in the use of *Cloaths*, and what else is for the outward comfort and support of the Body.

There is another sort of *Vertue*, which consists in the *Will*, which hath its proper Matter in its true Object, and relates to *Pleasure*, *Fear*, and *Boldness*. But there are two sorts of Pleasures, the one of the *Body*, and the other of the *Soul*. To moderate Bodily Pleasures there is a Vertue called *Temperance*, which consists in a right ordering of our *Words* and *Actions*.

This is the Vertue that Governs all our *Affections* and *Carnal Lusts*, which is an Enemy to all unruly Appetites, directing us to be ruled by our Reason, when we come either to covet, or refuse any thing be it good or bad. This is the Vertue that calms and sedates, that allays and softens our Minds by a certain Harmony. Now this *Vertue* extends not only to *Food* and *Raiment*, as also to *Buildings*, but likwise to *Luxury* and *Carnal Pleasures*.

Temperance in *Eating* is called *Abstinence*, in *Drinking Sobriety*, and in *Cloaths*, and *Building*, *Frugality*.

In opposition to *Luxury* is *Chastity* or *Continence*, which relates both to a single and Conjugal Life.

As for the Pleasures of the Mind, they proceed either from *Riches*, *Praise*, or *Society*.

Liberality is a *Vertue* which is most sutiable to the Nature of Man, and is the disposer of Riches; but there are many things therein to be considered.

First, That *Liberality* be not hurtful to those who receive it; Secondly, To those that may participate thereof; And Thirdly, That it be proportionable not only to the *Donors* ability, but likewise to the Persons *Estate* and *Condition* whom it is bestowed upon: And herein must be considered his *Manners*, what *Affection* he bears us, what Acquaintance we have with him, and what former Kindness he hath done us. Now there are five different Degrees of Human Society, 1; Of all Men together, 2; Of Men of the same *Nation*, or *Country*, 3; Of the same *Society*, 4; Of *Freinds*, and 5; Of *Kindred*. And we ought to be most kind to those that are neareſt unto us and from whom we have received most Kindnesses.

In Society two things are to be considered, *viz. Anger* and *Familiarity*. Now there are two *Vertues* that moderate *Anger*, *viz. Lenity* and *Severity*, that excluding, and this admitting of Revenge; And as there is nothing more praiseworthy, and becoming a Great Man than *Lenity* and *Humanity*; so a *Magistrate* must sometimes use Rigour and Severity, as a necessary Ingredient in point of Government: But when he inflicts *Punishments*, he must forbear *Anger*, because an Angry Man can never keep a *Medium*.

The three Vertues that belong to Human *Society* are *Truth*, *Humanity*, and *Urbanity*; therefore that which is true, simple and sound, is most sutiable and proper to the Nature of Man; and Truth has ever had so much Credit and Power, that it could never be subverted by Human Device or Artifice; and although it were left without any Support, yet it is able to defend it self.

The Second Vertue required in Human Society is *Humanity*, which may be otherwise Termed *Civility*, *Gentleness*, *Affability*, &c. 'tis well known how efficatious obliging good Language doth beget the good Opinion and Love of Man; and therefore the higher a Man is raised above other Men, the more humble he ought to shew himself; for then as this *Vertue* will be the more conspicuous, so it will be the more admirable.

The Third *Vertue* is *Urbanity*, which relates to *Pastimes* and *Recreations*, a thing we were not altogether Born unto, but only fit to be used as a *Relaxation* in our several *Callings* or *Professions*. We should use it as we do *Sleep* and *Rest*, for our Refreshment after our *Minds* or *Bodies* are wearied with the Affairs of the World: and let the Game, or Diversion be Innocent, and free from Vice.

Hitherto we have spoke of those *Vertues*, that relate to the Pleasures of the *Body* and *Mind*; the next shall be of that which concerns *Fear* and *Boldness*, termed by *Philosophers*, *Courage* and *Magnanimity*.

Its *Objects* are all manner of Dangers and *Hazards*, *Prosperity* and *Adversity*; for this *Vertue* raiseth a Mans Courage, and makes him slight such Accidents as usually happen to Man. In Prosperity it makes him Moderate, and keeps him from Haughtiness, and Insolence; and indeed 'tis a great want of Vertue in a Man, when he can't keep a *Medium* in *Prosperity* and *Adversity*; and as in *Prosperity* we ought not to be Insolent, so in Adversity we ought not to be Dejected. 'Tis *Prudence* to prevent *Adversities*, as far as it lies in our Powers, but when it comes upon us, we ought to bear it with Courage; and so to carry our selves, as to do nothing repugnant to that State and Degree, that is proper to a Wise Man.

And thus much of the *Vertues*; It follows now to speak a word or two of the *Vices* which are contrary to them.

Vice is an *Elective Habit*, erring from the Mean, either in excess or defect.

They have the same *Seat* or *Place* in the *Soul*, whence they continually endeavour to expel one another, to wit, the *Will*.

Here *Moralists* are to enquire, Whether *Vice* be against a mans Nature, or not? In answer to which we must consider, that though mans Nature be really, and truly but one, yet it may be considered either as *Animal* and *Sensitive*, or as *Rational* and *Intellective*.

The *Sensitive* part of Man is inclined to that which is sensibly Good, or seems so, though it be many times far distant from it: and yet such apparent Goods, whether they be Profit or Pleasure, are many times quite different from that which is honest.

And thus *Vice* may be said not to be against mans Nature, that is, his Sensitive Nature. For Sensitive Nature delights not in *Vice*, as it is Evil, but as it appears Good. In short, *Vice* is absolutely, and simply against mans Nature, as he is Man; for nothing is more agreable to Man, as he is Man, than right Reason, which is *Vices* mortal Enemy.

Again, We see that all Men have a natural inclination or love for *Vertue*, because every Man that is in his right Wits praises it, and effects to have it believed he is vertuous, by a most industrious concealment of his *Vice*. Which is enough to prove, That *Vice* is against mans very Nature.

Here they again enquire Whether *Vertue* and *Vice* can consist together; that is, in their Habit in the same Person.

If we speak of *Evangelical Vertues*, as *Fidelity* and *Infidelity*, or the like, we say they cannot; Or if we speak of the *Will*, it cannot at the same time will one *Vertue*, and its contrary *Vice*. But yet a *Vertue*, and its contrary *Vice*, may be outwardly acted by one and the same Person at the same time. And again, Vertuous and Vitious habits, that are directly opposed one to another, may at the same time be in the same Person, to wit, *in gradu remisso, non intenso*. In a remiss Degree not in its highest or most intense.

Concerning the division of *Vice* into its several *Species* or *Kinds*, we shall need say nothing; For what hath been already said of the *Vertues*, may give us a full and perfect sight of their Excesses and Defects.

And thus much for that part of *Moral Philosophy*, called *Ethicks*, or *Monasticks*. Now follows *Oeconomicks* and *Politicks*; the one teaching, &c. our Duty in our *Family*; and the other our Duty to the *Publicks*.

Oeconomicks teach a Man how to rule and govern his *Family*. It hath two general *Parts*; to wit, he that *Governs*, those that are *Governed*.

A *Master*, or he that *Governs*, may be considered in a threefold capacity; *viz.* As a *Husband*, as a *Father*, and as a *Master*; And every one of these have their particular Duties or Obligations; to wit, *Conjugal*, *Paternal*, and *Magisterial*.

The Obligations of a *Wife*, *Children* and *Servants*, are likewise parallel to these, and are breifly comprehended in Love, and Obedience. As the Master of the Families Duty is in Love and Care, and providing for them according to their several Capacities or Qualifications. For the Duty of the Master of the Family is one thing towards his *Wife*, another towards his *Children*; and still different from them both towards his Servants. And the several Duties of the *Wife*, *Chil-*

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Children and *Servants* are distinct and several in regard of their Relation to him again.

Politicks, which is the other part of *Moral Philosophy*, concerns the Government of the *Publick*, a *Country* or *Kingdom*, and that by good Laws; whereby both *King*, *Prince*, and *Subjects* may live happily; and the *Subjects* in a perfect Union amongst themselves.

A *Politick State* is divided into Publick and Private Persons. Those are *Publick Persons*, who are set up as *Magistrates* to Rule over the Rest, either in *Church* or *State*. Such were amongst the Antient *Romans*, their *Consuls*, *Ædiles*, *Censores*, *Prætores*, *Dictators*, *Tribuni*, *Quæstores*, and *Senators*.

The Private Persons are the Gentry and Commonalty; in which are to be considered such as are eminent, either in point of *Extraction*, *Riches*, or *acquired Parts*, both Civil and Military.

Next the Persons, must be considered the Method of *Government*, the *Courts* of *Judicature*, the *Jurisdictions*, *Laws*, *Contracts*, *Crimes*, *Trespasses*, *Judgments*, *Sentences* and *Decrees*.

Publick Governments are Administred either *By One*, *By a Few*, or *By Many*.

When a *Government* is Administred by *One*, it is called *Monarchy*: When by a *Few*, it is called *Oligarchy* or *Aristocracy*: And when by *Many*, it is called *Democracy*.

And here we are to observe, That though according to the Order of Nature, *Democracy* doth preceed both *Aristocracy*, and *Monarchy*, (because all, according to the Law of Nature are born free, and are hard to be brought under Government), yet according to the Order of Dignity, and also for its excellency and convenience, Monarchy is to be preferred before both the one and the other, as being likest to the Government of God Almighty himself.

Aristocracy, or the *Government* by a *Few*, holds the next place to *Monarchy* and *Democracy*, or the Government of *Many*, being in the Power of the People, who Govern by Deputies, or the like, is the lowest.

NATURAL

NATURAL PHILOSOPHY,
OR
PHYSICKS,
BOTH
Ancient and Modern.

NAtural *Philosophy*, or *Physicks*, is the knowledge of *Natural Bodies*. The Subject or Object of *Physicks* is Natural *Bodies*, considered as Natural.

The first division of *Natural Philosophy* is into General and Special. The General treats of the common *Principles* and *Affections* of *Bodies*; and the Special or Particular treats of the several kinds of *Bodies*, as hereafter shall be handled.

The common *Principles* (as Philosophers speak) of Bodies are these three, *Matter*, *Form*, and *Privation*.

By *Matter* is to be understood the first *Matter* out of which all things are made, considered absolutely without *Form* or *Accidents*, and this *Matter* is purely passive and susceptible of all Forms whatsoever.

Form is that which makes a *Body* what it is, and distinguisheth it from other *Bodies*; and there are several degrees of it. Some *Forms* only give *Bodies* their *Esse* or *Being*, as the Forms of all *Inanimate Bodies*. Some again give *Being*, *Life*, and *Sense*, as the Forms of *Brutes*: And some give *Being*, *Life*, *Sense*, and *Understanding*. And this is the last and highest Degree of *Forms*, which is only the *Rational Soul*.

Privation is the absence of Form in a *Body*, or *Subject*, that is fit to receive one. Now because no *Form* can be where *Privation* was not supposed before, it is by *Philosophers* numbred amongst those Principles which constitute *Bodies*.

The *Affections* of *Bodies* are either Internal or External. The *Internal Affections* of Natural *Bodies* are *Motion*, and *Termination* of *Quantity*. *Motion* is defined to be any change of *Body*, and is directly oppos'd to Rest. In all *Motions* of *Bodies* there are principally considered the *Terminus à quo*, or point from whence; and the *Terminus ad quem*, or Point whither, and the Time; for no *Motion* is made in an instant, but is successive.

The *division* of *Motion* is into *Natural* and *Violent*. *Natural Motion* is that which proceeds from the Natural Principle of the *Body*; as when *Fire* ascends, or heavy *Bodies* descend towards the *Center* of the *Earth*. So the *Locomotive Faculty* or Power in *Living Creatures*, of removing themselves from one place to another, is also said to be *Natural*. *Violent Motion* is that which is contrary to the *Bodies* Natural tendency, as when a *Stone* is cast upwards.

In all *Motion* we are still to remember there is a *Circle*, that is, a Succession always of a new *Body* into the place of the *Body* moved; and this Nature doth to avoid a *Vacuum*.

The several Notions of *Motion* are so difficult to be understood, that some have *Problematically* undertaken to maintain, that there is no *Motion* at all in the World: For Example, The Motion of a *Wheel* thus marked, we will suppose this to be turned or moved upon its own *Axel*. That part marked with *A* we know is moved, because (according to the definition of the Ingenious *De Cartes*, of *Motion*) it has changed its relation to the several *Bodies* about it, say the Sides of the Room wherein it is. Now whatever is moved, is moved either into a Full, or into an Empty place: Now if *A* be moved into a Full place, then there is a penetration of *Bodies*, and it is moved into *B*; if its moved into an Empty place, there will be a breach in the *Wheel*, besides a *Vacuum* in Nature. And what has been said of this *Motion* of the Whole, may in some measure be said of all *Motions*, as being *Circular*. All that I know to Answer in this case is, that a *Circle* being Infinite, and our *Capacity* but Finite, we are not able to comprehend its several *Phænomena*, no more than we are the *Essence* of God Almighty. The same may be said of *Infinite*, or rather the Indefinite extension of the *World*, and the Division of *Bodies*.

And thus from *Motion* we come to the other

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common Affection of *Bodies*, called *Finiteneſs* or *Termination* of *Quantity*; for all *Bodies* have their *Superficies*, and are circumſcrib'd by Place, and if we take away the Notion of a Bodies *Superficies*, you take away the very Notion of the *Body* it ſelf; it being the very definition of a *Body* to be meaſurable three ways (to wit, on the *Superficies*) in *Length*, *Breadth*, and *Thickneſs*. And therefore that diſtinction of the *Schools*, That Bodies are not *Actually*, but *Potentially* extended *in infinitum*, might well have been ſpared.

The *External Affections* of Body are *Place* and *Time*. *Place* is that which contains or circumſcribes *Body*, and is juſt as large as the *Body* contained, and yet is no part of it; notwithſtanding ſeveral things are ſaid to be in a place ſeveral ways, as *Bodies* are ſaid to be in a place circumſcriptively, *Angels* definitively, and *God* repletively.

To *Place* is oppoſed *Vacuum*, or rather the Notion of it; for it is a meer *Ens rationis*, and there is no ſuch thing in Nature.

Time is that whereby things are ſaid to be ſooner or later one than another. The *Only* (if it may be ſo called) is that which is not *Circular*, but goes ſtrait forward.

Time and *Motion* meaſure one another.

Thus much of the general Part of *Natural Philoſophy*, which treats of the Common *Principles* and *Affections* of *Bodies*; We come now to the *Particular* and *Special*, wherein are handled the ſeveral kinds of *Bodies*, which are divided into theſe ſix Parts.

1. The whole Machin of the *World* conſidered all together, as it makes one *Sphere*, wherein are contained both *Heaven* and *Earth*, the *Planets*, *Stars*, &c.

2. The *Elements*, as they are the Cauſes of *Mixtion* and *Natural Changes*.

3. Of *Bodies* imperfectly mixt, or *Meteors*.

4. Of *Bodies* perfectly mixt, both *Inanimate* and *Animate*.

5. Of the Parts of *Mans Body*.

6. Of the *Soul*; *Vegetative*, *Senſitive*, and *Rational*.

The firſt is of the *World* in general, or conſidered all together, as it makes one Fabrick.

The firſt thing in this great Body which *Philoſophers* are wont to diſcourſe of is *Cælum*, or *Heaven*, which they call a *Natural Body Simple*, *Spherical*, *Tranſparent*, and *Incorruptible*, which contains within it all the reſt. That it is a *Body* they prove, becauſe it conſiſts of *Matter* and *Form*. That it conſiſts of *Matter* is proved from its *Denſity*, *Rarity*, and *Quantity*, which are every one of them proper to a *Body* only. And then its very *Eſſe* or *Being* proves its *Form*; for without a *Form* no *Body* can be, although it muſt be confeſt, that this *Form* is no *Soul*; becauſe none of thoſe *Actions* which are peculiar to any of the three ſorts of *Souls* are obſerved in it. *Matter* and *Form* then are its *Principles*; Its *Affections* are *Motion*, *Figure*, and *Operation*; its *Motion* is *Circular*, and its *Figure* is ſo too, which of all others is the moſt perfect and capacious; Its *Operations* are by its *Motion*, *Light*, and *Influence*.

'Tis the Opinion of the *Peripatetick Philoſophers*, That the *Heavens* are a kind of *fifth Subſtance*, diſtinct from all the *four Elements*, *Ingenerable* and *Incorruptible*; though the *Elements* themſelves are ſaid to be *Corruptible*.

The Parts whereof the *Heavens* conſiſt, according to the *Ariſtotelian Philoſophy*, are theſe two, *Perſpicuous* or *Tranſparent*, and *Bright* or *Shining*.

Perſpicuous, as the ſeveral *Spheres* or *Orbs*; *viz.* 1. The Sphere of the *Moon*, 2. That of *Mercury*, 3. That of *Venus*, 4. That of the *Sun*, 5. That of *Mars*, 6. That of *Jupiter*, 7. That of *Saturn*, 8. The *Firmament*, 9. The *Chryſtalline Heaven*, and 10. The *Primum Mobile*, or higheſt of all. But of this I refer you to the Treatiſe of *Aſtronomy* or *Coſmography*, to which it properly belongs.

The other Part is *Bright* or *Shining*, and comprehends the *Stars*, which are either *fixed* or *wandring*, which alſo belongs to *Coſmography*.

Beſides theſe *Stars*, there is obſerved in the *Heavens* that which we call *Galaxia*, or the *Milky-way*, which is thought to be a confluence of many little *Stars*, which by reaſon of their *ſmalneſs* can't be diſcerned one from another, and yet by their joynt *Light* make up that bright place of *Heaven* ſo called.

Under this common Place of the *World* next to the *Heavens* they uſe to place the *four Elements*; and theſe they conſider either *abſolutely*, as they are Parts of the *World*; or *reſpectively*, as they are the Cauſes of *Mixtion* and *Natural Changes* in other *Bodies*.

An *Element* is defined to be a *ſimple Body*, into which other *Bodies* are reſolved; and it will be hard to find any *Body* that has not ſome of the *four Elements* in it. They are oft-times alſo changed into one another, as *Water* into *Air*, *Air* into *Water*, and the like. In their own places they are neither *light* nor *heavy*, but being ſet in an Unnatural place, the heavy, as the *Earth* and *Water*, tend downwards; and the light, as *Fire* and *Air*, fly upwards.

But to ſpeak a word or two of each in particular, I ſhall begin with the higheſt in place, which is *Fire*.

Fire is a *dry Element*, and is the lighteſt of all other, which is the cauſe that it has the higheſt place of the *Elements*, under the Concave or Sphere of the *Moon*.

And whereas ſome have frivolouſly objected, That then it would feed upon all the *Bodies* next it, as upon *Fuel*, and ſo deſtroy whatever there is of *mixt* or *compounded Bodies* below it. We are to take notice, that there is a great deal of difference betwixt this *Elementary Fire* and our *Culinary Fire*, or that which is of ordinary uſe. For *ſhining*, or giving *light* and *burning* is not Eſſential, or Part of the Being of *Fire*, as it is an *Element*; but it is an Accident, which proceeds from the *Subject* or *Matter* which burns. And this is eaſily proved from the *denſity* or *rarity* of it, or from its degrees of *intenſion*, according to the quality of the *Matter* in which it is: For Example, The *flame* of *Pitch* is much *hotter* or more *denſe*, than that of *Spirits* of *Wine*; and a *Red-*

Red-hot-Iron will burn much more than any Fire in *Straw*, or the like; ſo that it ſeems the *Elementary Fire* does not burn as our ordinary *Fire*, becauſe of its rarity of thinneſs: And this is alſo the Reaſon that it is not ſeen, it being much thinner or rarer than either *Wind* or the *Air*; whereas *denſe* or *thick Bodies* only are the Object of Viſion.

Again whereas our Culinary Fire ſtands in continual need of *Fuel* to preſerve it, this *Elementary* does not, becauſe it is not ſubject, like the other to the Injuries of contrary *Bodies*, and ſuch as do naturally deſtroy it, as too much *Water*, or the like.

Air is a light *Element*, moderately Hot, but the moſt Moiſt or Fluid, and fills every place below the *Fiery Region*, which is not filled or ſupplied by ſome other *Body*.

It is divided into three *Regions*, the *higheſt*, *middle*, and *loweſt*. The *higheſt* reaches from the *Fiery Region* to the *Middle Region*, and is hot, by reaſon of its vicinity to the *Fiery Region*, and alſo from the violence of the Motion of the *Heavens*. The *middle* is that which lies between the *higheſt* and the *loweſt*, and no *Vapors* or *Exhalations* ariſe higher than this *Region*; and it is Cold, becauſe the *Beams* of the *Sun* are reflected no higher from the *Earth* than to the uppermoſt part of the loweſt *Region*.

The *loweſt Region* of *Air* takes up that ſpace betwixt the Surface of the *Earth* and the *middle Region*, *viz.* juſt as much as is warmed by the reflexion of the *Sun*. Now becauſe the *Sun-beams* are reflected higher in *Summer* than in *Winter*, it follows, that the *loweſt Region* of *Air* is greater in *Summer* than in *Winter*, and the *middle Region* leſs.

That the *Air*, conſidered as an *Element*, is moderately hot is proved, becauſe it is generated from *Heat*; as when *Water* is made *Air* by evaporation over the *Fire*, and contrariwiſe, becauſe its reduced again into *Water* by *Cold*, as we ſee on the Surface of *Marble* and other *Stones*, in *Sellars* or Damp places. Again, the *Air* is light, and we know that *lightneſs* is a conſequent of *heat*.

Water is a moiſt and ponderous *Element*, the coldeſt of all others, flowing between ſeveral parts of the *Earth*, and with it makes one entire *Globe*.

That it is the coldeſt of all the *Elements* is proved, becauſe it is the moſt contrary, and makes the greateſt oppoſition to *Fire*, which is the hotteſt.

And that the Surface of the *Water*, as well as of the *Earth* is *Globular*, appears from this Experiment in *Navigation*; Men do by little and little loſe ſight of the *Earth* as they Sail farther from *Land*; firſt they loſe the ſight of the *Earth*, then of the *Trees*, and laſtly of the *Hills* and *Mountains*, which can't poſſibly proceed from any other Cauſe than its round or riſing Surface, interpoſed betwixt the *Ship* and *Land*; but this is the proper entertainment of another *Science*.

Earth is a cold *Element*, the dryeſt and moſt ponderous of all others, and is placed in the *Center*, according to the Ancients. That it is dryer than the *fiery Element*, is proved from the definition which *Philoſophers* give of Dryneſs; *Siccity* or *Dryneſs* of any thing (they ſay) conſiſts in its being eaſily contained in its own bounds, by which they mean no more than this; That thing is ſaid to be *Dry* whoſe parts are eaſily kept together, as all *Bodies* of a firm conſiſtence, ſuch as the *Earth* is. *Humid*, on the contrary, is that whoſe parts are not eaſily kept together; ſo that according to the definition for *Humidity*, I think we may very well and properly uſe *Fluidity*, and for *Dryneſs*, *Conſiſtence*. And then it will be plain and eaſie, that the *Air* is more *humid* than the *Water*, becauſe it is more *fluid*, which appears, becauſe it enters where *Water* can't. And ſo the *Earth* is *dryer* than *Fire*, becauſe it is of a finer conſiſtence, or is not ſo eaſily ſeparated. And this ſame conſiſtence or cloſeneſs of the Parts, which they call *Denſity*, is the reaſon alſo, that the *Earth* is the moſt ponderous of all *Elements*.

I ſhall here take further notice only of theſe two Affections, its *Figure* and *Motion*.

As to its *Figure* it is *Globular*, as aforeſaid.

This they prove by many Arguments; but I ſhall only in paſſing give you theſe two. Firſt, From its *Shadow*, which is round, and ſo muſt the *Body* be alſo: Secondly, From the Riſing and Setting of the *Stars*.

It has been much controverted amongſt *Philoſophers*, whether the *Earth* have any Motion, or not. *Ariſtotle*, and ſome others of the Ancients, that thought the *Earth* had no *Motion*, were wont to uſe this Argument; If the *Earth* have any *Motion* at all, then that *Motion* is either Natural or Violent; but it can be neither Natural nor Violent: *Ergo*, It can't be *Natural*, becauſe being in its own *Center* and place where it would be, it muſt like all other *Bodies* (in their proper places) reſt and be quiet. And *Violent* it can't be, becauſe that *Violence* would in time ceaſe; it being a received Maxim, That no Violent thing is perpetual.

To this I anſwer, That its *Motion* may be as Natural to it, for ought we know, as that of the *Primum Mobile*; for its *weight* and *gravity* can never be ſuppoſed to make it ſtand ſtill, becauſe nothing is *heavy* in its own place, whence it is conſeſt the *Earth* is ſituate, and cannot weigh at all. This I would have underſtood of the *Earths* being moved about its own *Axel*; and I believe you may as well ſay, the *Motion* of the *Primum Mobile* may come to ceaſe, becauſe at firſt it was Violent. We are not therefore to enquire into the Cauſe or Reaſon of its *Motion*, it will be enough for us to ſolve all the *Phænomena* in Nature, that depend thereupon, by ſuppoſing it; for thoſe *Poſtulata* are common in all the Doctrine of *Aſtronomy*, whither of right this *Motion* of *Earth* pertains.

But methinks again, it is contrary to the order of *Nature* that the *Earth* ſhould ſtand ſtill, and the reſt of the *World* move round about it, becauſe *Nature* does always things the ſhorteſt way. Now for the *Heavens* to be moved about the *Earth*, as their *Center*, muſt needs ſuppoſe ſuch a *rapidity* and *violence*, eſpecially in the higheſt of

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of them, as is scarce conceivable; whereas this may easily be avoided, by supposing the *Earth* it self to be moved.

And now we come to consider the *Elements* as they are, the Cause of *Mixtion* and Natural Changes.

In the *Elements* as they make up Mixt *Bodies*, we are to consider these several things.

Qualities, *Action and Passion*, *Alteration*, *Generation*, *and Mixtion*.

Qualities are either first or second, or hidden *Qualities*, as *Philosophers* say.

The first *Qualities* are these four, *Heat*, *Cold*, *Moisture*, and *Dryness*; and from these arise no less than fourteen Second *Qualities*, as they call them, *viz. Density and Rarity*, *Gravity and Levity*; *Hardness and Softness*; *Thickness and Thinness*, which proceeds from *Dryness and Moistness*; *Slipperiness* and such a Degree of *Dryness* as is directly opposite to it; *Toughness and Brittleness*; *Roughness and Smoothness*.

Their Occult Qualities are scarce worth the Naming, because when they are able to give no Natural Reason of any thing, they use to say it is a hidden *Quality*, or it is done by *Sympathy* or *Antipathy*, which in plain English is as much as to say we know not how.

In the next place we are to speak of *Action* and *Passion*, and this we can't do without speaking of Contact or Touching, which is the necessary manner of things working upon one another.

Now this *Contact* is said to be proper, or improper. Proper is a true and Corporal touching, as when the *Superficies* of two Bodies do so meet and touch one another, that they move one another, and are moved one by the other. Improper or Vertual, is when the Vertue or Emanations of one Body, at a distance work upon another so as to produce some effect, as the *Sun* warms the *Earth*, the *Loadstone* draws up *Iron*, &c. By both these ways of Touching the *Action* and *Passion*, or *Agent* and *Patient*, work one upon the other. That which works or produceth the effect in the other, is called the *Agent*, and Work it self in respect thereof, is the Action; that which is wrought upon, or in which the effect is produced is called the *Patient*, in respect of which the Work is called Passion. And it must be always remembred, that as there is some likeness between the *Agent* and the *Patient*, otherwise a thing might be said to work upon it self, that is to say, to Assimulate or make it self like it self, which were absurd.

Alteration is the change of any *Quality* or *Accident* in a *Body*, and differs from *Generation*, in this, that *Generation* alters the whole Substance; and yet *Alteration* is as it were the way and Companion of *Generation*.

Generation is a Change from Privation (that is an Aptitude, or readiness to receive a *Form*) to a *Form* (that is, an Essence which distinguishes any thing from all things else) in matter.

The Causes of *Generation* are four, The *Efficient*, the *Matter*, the *Form*, and the *End*.

The *Efficient* Cause in *Generation* is either *Remote*, as the Influence, Light and Motion of the Heavenly Bodies; and the next which is the thing begetting, which endeavours to produce another thing like it self.

The *Material Cause* is also either *Remote*, which is the first Matter which carries always with it the Principle of Privation, and is capable of all *Forms*, or next which is a Mixture of the four *Elements*.

The *Formal Cause* is the very Substantial Change it self, that is, from *Privation* to *Form*.

The Final Cause of *Generation* is the Conservation of the Species, because Nature abhors Destruction.

Corruption is directly opposite to *Generation*, and implies a Change from a *Form* to a *Privation* again. And hence it is, that the Corruption of a thing is always the Generation of another; for Matter (I mean that which I called the next Matter of any thing) which is a Mixture of the four *Elements*, can't possibly subsist without a *Form*, but so soon as it lays down or loseth one *Form*, it takes up or receives another.

Mixtion is the Union of two different Bodies, which are capable of being Mingled.

The Word is taken in its largest Sense for any sort of Mixture, as that of *Barly*, or any other *Grain* with *Wheat*. But strictly and *Philosophically* for such a Mixture of the *Elements*, whereby they wholly lose their first *Forms*, and acquire a new one, which is the *Form* of the Mixt Body.

The *Conditions* or *Circumstances* required herein, are either such as belong to *Bodies* mingled, or such as belong to the *Act* or *Mixtion* it self.

In the *Bodies* mingled, it is required that they should both be *Agent* and *Patient*, so that this be easily made small, that there be an exactness in the *Quantity* and *Proportion*.

In the *Act* or *Mixtion* it self are required a due meeting, or joyning of the *Elements* together, their Acting one another, and a Division of them into very little parts, which can't be done without Humidity. And the Consequence of this *Mixtion* is called *Temperament*; which is nothing else but the Complexion of the four first *Qualities*, as they are found in the Mixt Body, to wit *Heat* and *Cold*, *Dryness* and *Moistness*.

The next thing in our Order to Treat of, are *Bodies* imperfectly Mixt, or *Meteors*.

Meteors are Bodies imperfectly mixt, which are generally from the Exhalations of the *Earth* or *Water*, being Raised by the Heat of the *Sun*, or the Vertue of the *Stars*.

In this Discourse of *Meteors*, these three things, are to be taken notice of, their *Causes*, *Place*, and *Division*, or several Kinds.

Their *Remote* Causes are the Heavenly, which by their Influence exhale and raise up the matter of them.

The next or Instrumental Cause is either *Heat* or *Cold*. *Heat* by piercing into the *Earth* or *Water* Rarifies them, and raiseth them up into the *Air*, and *Cold* unites and condenses them above, when they are thus raised.

This for the *Efficient Cause*, the *Material Cause* is

is either the *Remote* with the *Elements*, but for the most part *Water* or *Earth*, or the next Cause, which is either *Vapour* or *Exhalation*.

A *Vapour* is hot and moist, and proceeds from Water; an *Exhalation* is hot and dry, and comes from the *Earth*; and there are these two sorts of it, one which easily takes Fire, being Matter of *Fiery Meteors*, the other not, being Matter of *Winds*.

The place of these *Meteors* is for the most part the *Air*. For even those that are generated in the *Caverns* of the *Earth*, are generated in the *Air*, that is, the *Air* that fills those *Caves*.

They are divided into these two sorts, *viz.* into *Hypostatical*, that is, such as are Real Substances, and *Emphatical*, or such as only make a shew or Appearance.

Those that are Substantial are again Subdivided into three Species or Kinds; *Fiery* which are from *Exhalations* easily Inflamable; *Watery* which are from *Vapours*; And *Airy* which are produced by *Vapours* and *Exhalations* mixt together.

There is another Division of *Meteors* into pure and mixt, pure are such whose Matter is simple and pure, and are either Generated in the Highest, Middle or Lower Region of the *Air*. Those that are generated in the Highest Region, are called *Torches*, *Beams*, or *Perpendicular Fires*, *Fiery Darts*, *Dancing Goats*, *Flying Sparkles*, &c. A *Torch* is a *Meteor* of a thin and rare Substance, which being set on *Fire*, all the upper end resembles a lighted *Torch*. A *Beam*, or *Perpendicular Fire* is long and more compact, and being set on *Fire* shews like a *Beam*, hanging right downward. A *Fiery Dart* consists of grosser and subtiler, or rarer Parts equally mixt together, which being kindled and flying upwards, resembles a *Dart* or *Arrow*. *Dancing Goats* are so called, when the *Meteor* is divided into Two Parts, and being set on Fire, seems to leap and skip like *Goats*.

Meteors generated in the Middle *Region* of the *Air*, are either *Falling Stars* or *Burning Lances*. A *Falling Star* is a round *Meteor*, which being set on Fire, and by some *Cloud* droven downwards, shews as if a *Star* fell from *Heaven*; others are of Opinion that the *Exhalation* it self is as long as the *Line*, in which the *Stars* seem to fall, and being lighted at one end like a Train of *Gunpowder*, takes Fire in a Moment.

A *Burning Lance* is of the same Substance with a falling *Star*, only the Matter differs in *Figure*, representing a *Lance* or *Spear* all the way it falls.

Meteors generated in the Lower Region of the *Air*, are either *Fiery Dragons*, or *Ignes Fatui*, that is, Going Fires. A *Fiery Dragon* is a Great *Exhalation*, which being raised a great Height in the Lower *Region* of the *Air*, and there sets on Fire by its oblique and crooked Motion, resembling a *Flying Serpent* or *Dragon*, as our *Philosophers* fancy.

Ignes Fatui, or Going Fires are of two Sorts, the grosser is commonly seen in Low Grounds, or *Marshes*, oft times making People mistake their way.

The more Subtile or Finer is called *Ignis Lambens*, because it sticks sometimes to *Mens Cloths*, to *Horses Heads* or *Mains*, to the Shrouds and Rigging of Ships and the like, and yet doth no hurt, by Reason of its great Subtilty.

Now the manner of setting most of these *Meteors* on Fire, is conceived to be either the Swiftness and Violence of their Motion, as *Millstones* and the *Wheels* of *Carts* and *Coaches*, which sometimes by their Motion produce Fire; or else by an *Antiperistasis* as they speak, which is a Violent Fighting or Opposition between Heat and Cold, just as Stacks of Hay laid together before they be dry, grow hot, and sometimes take Fire.

These are the *Meteors* which are called pure, by Reason they consist altogether of *Exhalations* from the *Earth*. And now we come to speak of such *Meteors* as the *Philosophers* call Mixt; because the *Exhalation* is mixt with Vapours, which are drawn up, as we said before, from *Water*, and are more impure, gross and Viscous.

And these mixt *Meteors* are such as continue for a certain Space, as *Comets*, or else such as by Reason of the little quantity of Matter are suddenly Dissipated, as Thunder.

A *Comet* has its Name from the *Beard*, or Tail which always accompanies it. Some have been of Opinion that *Comets* are either a Conjunction of several *Planets* together, or else an extraordinary Appearance of one Single *Planet*. The former Opinion is resel'd; because a *Comet* is sometimes seen when there is no *Conjunction* of the *Planets*; as likewise because the *Planets* are never seen, without the *Zodiack*, whereas *Comets* oft times are.

Again, no *Comet* can be a single *Planet*, because the *Planets* are always, or at least for the most part seen in Cleat Nights, but *Comets* never; as also because no *Planet*, or Fixed *Star* is ever Increased or Diminish't, which as Experience teacheth us *Comets* are.

A *Comet* is defined to be a *Fiery Meteor*, composed of a Dry Viscous and plentiful *Exhalation* close compacted together, raised up into the Higher *Region* of the *Air*, and being there set on Fire, shews like a great *Star*.

Philosophers say that all *Comets* are set on Fire, either by the violent Motion of the upper *Region* of the *Air*, or else by some little Sparks of the neighbouring *Elementary Fire*, which fall upon the *Exhalation*. The Matter of, them appears to be a Fat, Gross, and very Plentiful *Exhalation*; because at such times as *Comets* appear, there are commonly great *Winds* and *Droughts*, the reason of which is the great Plenty of *Terrene Exhalations*, which at that time fill the *Air*.

The *Affections* of *Comets* are Place, which is the upper *Region* of the *Air*; and Time either of their Apparition or Duration.

The time of their Apparition is for the most part in the *Autumn*, there then being the greatest Plenty of such *Exhalations*, as are the Subject Matter of them.

The time of Duration is uncertain, which is determined by the Quantity of their Matter, though few are observed to continue more than Six Months, or less than seven Days.

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Their last Affection is *Colour*, which is different according to the rarity or denſity of their *Matter*.

Thunder is a *fiery Exhalation*, which breaks from the *Clouds* with great force and violence.

It is generated by being incloſed, as in a *Coat* or *Skin*, and afterwards ſet on Fire, either by the violence of its Motion, or by an *Anteperiſtaſis*. Its Motion is very regular for this Reaſon, becauſe the Fire would naturally aſcend upwards, and the Force with which it breaks through the *Clouds* preſſes it downwards.

The *Accidents* of it are theſe, its great *Sound*, and its ſudden *Shining*. The reaſon of the *Sound* or *Noiſe* is its breaking through the *Cloud*, which is no longer able to contain it, by reaſon of its *rarifaction*, as ſoon as it is ſet on fire, like *Powder* in a *Gun*.

Its *Shining*, which we call *Lightning*, is nothing but the appearance of the *Fire* at the breaking of the *Cloud*, which we ſee a good while before we hear the Blow or Noiſe. Sometimes we ſee the *Lightning*, and never hear the *Thunder*, which is either, becauſe the *Cloud* is broken with leſs violence, or it may be by reaſon of the great diſtance, or both.

Watery Meteors are begotten either in the middle Region of the *Air*, or in the lower, or in the *Caverns* or *Hollows* of the *Earth*.

Thoſe that are begotten in the middle Region of the *Air* are either *Clouds*, or *Rain*, or *Snow*.

A *Cloud* is a *Vapor* raiſed up into the middle Region of the *Air*, and there condenſed by the coldneſs of the Place.

The Efficient Cauſes of it are the *Sun* and *Stars*, which exhale *Vapors* from the *Sea*, *Rivers*, and *moiſt Grounds*; and the Cold gathers and condenſes thoſe *Vapors* into the conſiſtence of a *Cloud*.

The Material Cauſe is the *Vapor* it ſelf, ſo raiſed by the *Sun*, and condenſed by the *Cold*.

Rain is a *Cloud* diſſolved into *Water*, and is either *Natural* or *Prodigious*; *Natural*, when it falls down in great or ſmall Drops of *Water* only. *Prodigious*, as when *Frogs*, ſmall *Fiſh*, or the like, deſcend with it, which are generated in the *Air* from the ſame *Vapors* or *Matter*, which were fit to have generated them below, before they were raiſed by the power of the *Sun* or *Stars*.

Snow is a *Cloud* frozen together before the *Vapor* be diſſolved into Drops, by the intenſe or vehement Cold of the middle Region of the *Air*, and the reaſon of its *whiteneſs* is the many little Particles of *Air* frozen up amongſt it, which if the *Pores* were ſtrait, as in *Horn*, *Glaſs*, or *Ice*, the *Body* would be tranſparent.

Watery Meteors, which are generated in the loweſt Region of the *Air*, are either *Hail*, *Dew*, *Hoar*, *Miſt*, or *Ice*.

Hail is *Rain* frozen in the *Air*, and is made by the Freezing of the Drops of a *Cloud* diſſolved into *Rain*, as it falls to the ground.

Dew is a ſubtil or thin *Vapor* raiſed from the *Earth* by the heat of the *Sun*, but to no great height; ſo that as ſoon as the *Sun* is Set, is condenſed by the Cold of the *Air*, and ſo deſcends upon the *Earth* again by its own weight.

Hoar is alſo a thin *Vapor*, raiſed not far from the *Earth* by the *Sun*, which in the falling down is again frozen into the form of *Salt*.

Miſt is a thick *Vapor*, raiſed from the *Earth* moſt commonly by the Riſing or Setting of the *Sun*, which being condenſed by the Cold obſcures the loweſt part of the *Air*.

Ice is *Water* congealed in *Ponds*, *Rivers*, *Lakes*, &c. by the extremity of Cold.

In the *Caverns* or *Hollows* of the *Earth* are generated *Fountains*, *Rivers*, and *Seas*.

Fountains without doubt are generated in the *Caverns* of the *Earth* of *Air*, which ſtriking againſt the Sides of them is there condens'd into *Water*, as we ſee on the Walls of *Vaults* and *Sellars*; where, as the Drops grow big, they trickle down, and meeting in the loweſt place they joyn together, and come out in *Springs* or *Fountains*.

Thus Suppoſition makes it very intelligible, how *Fountains* ſhould be perpetual, becauſe the *Air* perpetually enters thoſe *Caves*, and is perpetually there condenſed.

Nor do I think by any means impoſſible to make an *Artificial Spring*, by building ſeveral *Arches* or *Vaults* of fit and convenient *Stone*, whoſe Sweating or Drops might by little Channels on the Ground be brought to make a *Spring* or *Fountain*.

Furthermore, it adds ſomething to the likelyhood of this Opinion, that Hilly-Countreys, as the *Alps*, &c. have more Springs than Plain-Countreys (as *Holland*, where are very few) becauſe there are more *Caverns* in the Earth there.

Rivers are a confluence or meeting of *Fountains*, and ſo is the *Sea* of *Rivers*; only there are ſome *Qualities* and *Affections* of the *Sea*, which will be very neceſſary in this place to enquire into; *viz.*

1. Since all *Rivers* flow continually into the *Sea*, how comes it to paſs that it doth not overflow its bounds, and cover the whole *Earth*? The Reaſon is, becauſe as much *Water* as is brought into the *Sea* by the *Rivers*, is exhaled up again by the *heat* of the *Sun*, which rarifies it ſo, that it is ſcarce or very ſeldom perceived. So that in this, as well as in many other Courſes of Nature, there is a perpetual Circulation.

2. Another thing we are to enquire after, is the *Saltneſs* of the *Sea*. Since all the *Rivers* that flow into it are freſh, how comes it to paſs that the *Sea* it ſelf is *Salt*?

To this may be Anſwered, That the *Sun* by lying upon its vaſt Surface continually exhales many of the thinneſt and ſubtileſt Parts of it, and leaves the more Groſs and Earthy behind, which being in ſome meaſure concocted and heated in the *Sun*, do thereby acquire that Salt favour. There are many Reaſons that confirm this; As,

1. When we boyl *Salt-Water*, we find that the Parts which evaporate are Sweet and Freſh, and thoſe that remain become the more Salt.

2. Another Argument is, That the *Water* of the *Sea* in *Summer* is ſalter towards the *South*; which is, becauſe the *heat* of the *Sun* hath there exhaled more of the Sweet or Freſh parts.

Laſtly, The *Sea-Water* is by experience found to be ſalter at the Top than the Bottom; which is, becauſe the *Sun* hath taken away the Freſher and Sweeter parts next the *Surface*.

3. The laſt Affection of it is the *Tide*, or *Flux* and *Re-flux*.

That the Great *Philoſopher Ariſtotle* ſhould drown himſelf, becauſe he could not dive into this ſecret in Nature, I believe is but a Fiction; But certain it is, that in all thoſe Books of his there is not a Word of it; yet his *Scholars*, and moſt of the old *Philoſophers*, having conſidered the exact correſpondence between the Tide and the *Moon*, and alſo between the *Moon*, and many other *Watry Bodies* have aſcribed the *Tides* to the influence of the *Moon*; though for my part I cannot ſee any Natural Connexion between the *Cauſe* and the *Effect*, which is the firſt thing ſhould be enquired into. And if there be no other Reaſon to be aſſigned, but their exact keeping of Time, I can't ſee why the *Full Moons* may not as well be ſaid to depend on the *Spring Tides*; but it may be there is a third thing yet undiſcovered, which is the cauſe of both. In ſhort, whatever hath been offered hitherto by any, hath given ſome Men no great Satisfaction, eſpecially when they call to mind the ſetting of *Currents*, and the vaſt difference of *Tides*, both in reſpect of *Time* and *Meaſure*. However all conclude, that the end or deſign of Nature (which ſtill does every thing for the beſt) is hereby to keep the Waters of the *Sea* from any *Stench*, *Putrefaction*, or *Corruption*, which of neceſſity muſt happen if they did ſtagnate or remain unmovable.

Airy Meteors are either *Winds*, or *Earth-quake*; *Wind*, the *Philoſophers* ſay, is a copious Exhalation raiſed by the *Sun* and *Stars* to the middle Region of the *Air*, and thence violently driven back again by the coldneſs and denſity of that *Region*: The *Matter* of this *Exhalation* ſhould ſeem to be *hot* and *dry*, becauſe it is obſerved that Winds are moſt frequent at ſuch times as theſe *Exhalations* do moſt abound.

An *Earth-quake* is a Trembling of the *Earth*, proceeding from certain *hot* and *dry Exhalations*, ſhut up within the *Bowels* of the *Earth*, and endeavouring to get forth.

Thus of *Subſtantial Meteors*; Thoſe *Meteors* that are only apparent I ſhall in brief name, which are theſe Five, 1; *Vocugo*, which is a *Gulph* or *Ditch*, 2; *Halo*, which is a certain brightneſs about the *Moon*, or any *Star*, 3; *Virga*, or *Rods*, from the reſemblance which the Beams of the *Sun* make by refraction, when they fall upon a *Watery Cloud*, 4; *Parrelins*, which is the Image of the *Sun*, refracted in ſome thick and *Watery Cloud* near its own Body, and which ſeems to ſtand ſtill ſometime according to the diſpoſition of the *Clouds* about the *Sun* and there are more of them than one: The ſame happens ſometimes alſo to the *Moon*, 5; And laſt, is the *Rain-Bow*, which is nothing but Reflection of the *Rayes* of the *Sun* from a *Watry-Cloud* near the *Earth*; It is always a part of a *Circle*, but greater or leſs, as the *Sun* is nearer or further from the *Horizon*.

The next thing in our Method is to ſpeak of *Bodies* perfectly mixt.

A *Body* perfectly mixt, is that which has a perfect Form of its own, diſtinct from that of the *Elements*.

The *Affections* of the *Bodies* perfectly mixt proceed from their *Qualities* which are either Active, as *Heat* and *Cold*; or Paſſive, whereby they are ſaid to be capable of *Melting*, *Softning*, *Bending*, *Breaking*, *Sharpning*, and the like.

Bodies perfectly mixt are either *Inanimate* or *Animate*. *Inanimate* as *Metals*, *Stones*, and Half or Baſtard *Metals*.

A *Metal* is an *Inanimate Body* perfectly mixt, made or growing in the *Bowels* of the *Earth* of *Sulphur* and *Mercury*.

Their principal Efficient Cauſe is the Vertue of the *Stars*, but eſpecially of the *Sun*.

The Inſtrumental Cauſes are *Heat* and *Cold*.

Their Affections are theſe three; Firſt, They may be all melted; but theſe which have more of the *Terrene* Concretion, with more difficulty. Secondly, All *Metals* are ductile and Malleable; but eſpecially thoſe which are more compact and ſoft. Thirdly, They are all weighty by reaſon of the cloſeneſs and compaction of their *Matter*.

Their *Species* are either Pure, as *Gold* and *Silver*, or Impure, as *Lead*, *Tin*, *Braſs*, and *Iron*.

Stones are *Inanimate Bodies* perfectly mixt, of a hard Earthy Subſtance, mingled with a ſort of unctuous Moiſtneſs, and in length of Time grown together by the Vertue of *Heat* and *Cold*.

They are divided into Vulgar or Common, as the *Pumice*, *Free ſtone*, *Marble*, *Alablaſter*, *Flint*, &c. and into Precious, as the *Diamond*, *Ruby*, *Saphir*, *Carbuncle*, *Amethiſt*, *Chryſolite*, *Jaſper*, *Emerald*, *Onix*, &c.

There are other *Bodies* diſtinct from theſe which are placed in this *Topick* by the Name of half or *Baſtard Minerals*. And theſe are ſuch as have (as it were) a middle Nature, between *Stones* and *Minerals*, and partake of ſomething with each of them, and yet in ſomething differ from them both.

Some of them may be ſoftned but not melted, as ſome kind of *Earths*, viz. *Chalk*, *Plaiſter*, *Oker*, *Potters Clay*, *Terra Sigillata*, ſo called, becauſe they uſe to ſet a Seal upon it.

Some again may be melted, as *Salt*, *Alom*, *Pitch*, *Sulphur*, *Vitriol*, &c.

Bodies Animate have either no Senſe, as *Plants*: or that have Senſe, as *Animals*.

Plants are *Animate Bodies*, which grow or encreaſe, and have the faculty of Nutriment and Generation.

The Parts of *Plants* are Principal, or leſs Principal. The Principal Parts again are either *Similar* or *Diſſimilar*. The *Similar Parts* are the *Juice*, which is as it were their *Blood*; Their *Tears* are thoſe Humors which Naturally and of their own accord ſweat; Their *Fleſh* or *Pulp*, which is like the *Muſcles* in an *Animal*; Their *Fibres* reſemble the *Veins* or *Nerves*, and their *Bark* reſembles the *Skin*. The *Diſſimilar Parts* are the *Root*, which is like the Mouth in the *Earth* to receive Nouriſhment; The *Stalk*, which receives the Nutriment from the *Root*, and carries to all the Parts of the *Bodies*; The *Marrow* or *Pith* is the inward

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ward Part of the *Stalk*. The *Branches* are spread abroad every way like *Arms*.

The less Principal Parts are such as are neither of the *Plants* Essence, nor yet necessary for its Propagation, as *Leaves*.

The Corruption of a *Plant* is either Natural or Violent. Natural is when the Natural Heat hath overcome the Natural Moisture, and so it withers and dries of it self: Violent when it is Corrupted or Perishes by any outward Principle, as *Heat*, *Frost*, or the like.

Their several sorts are *Trees*, *Shrubs* and *Herbs*.

An *Animate* or *Living Creature* is an *Animate* Body, which hath Sense, and moves it self from one place to another, and is either *Rational* or *Irrational*. The *Irrational* are either imperfect or perfect. Imperfect as *Insects*, which have *Bodies* distinguished into certain *Joynts* or *Sections*, and the life almost equally spread through all parts; and they have no Blood, nor do they Breath. There are two sorts of them, the one hath *Wings* as *Flyes*, *Gnats*, *Wasps*, *Bees*, *Beetles*, &c. The other not, as *Gnats*, *Spiders*, *Flees*, *Locus*, &c.

Perfect Irrational Animals are either *Amphibious*, that is, such as live in both the *Elements* of *Air* and *Water*, As *Otters*, *Frogs*, *Tortoises*, *Rats*, &c. Or such as live but in one of the *Elements*; and those are either *Fish*, as *Whales*, *Salmons*, *Herrings*, *Sikes*, *Eles*, *Carps*, *Tench*, &c. which inhabit the *Water*; or *Beasts*, as *Horses*, *Cows*, *Lyons*, *Dogs*, *Deer*, *Hares*, *Foxes*, &c. which live on the Land; or *Fowls*, as *Turkeys*, *Pigeons*, *Pheasants*, *Partridges*, *Woodcocks*, *Snipes*, *Black-Birds*, &c. with innumerable others of each sort, too tedious to repeat, which live in the Air.

Rational, as *Man*. The Masterpiece of the visible World, for whose Use and Service all other things were made. As also the Structure of his *Body* is the most curious of all others. His Parts are *Body* and *Soul*. And here we shall take notice, first of his *Body*; because thereby we may also at the same time arrive to a good Degree of Knowledge in the *Bodies* of other *Animals*.

The *Parts* of *Mans Body* are divided into these Parts, which are contained, and those which contain. Those contained are either Humour, or Spirits. *Humour* in General is desin'd by a liquid Part of the *Body*, contained in certain Vessels, for the Conservation of the whole *Body*. *Humours* are either Excrementitious as *Sweat*, *Urin*, *Dung*, &c. or not Excrementitious, but of use; as *Blood*, *Chyle*, *Choler*, and *Melancholy*.

Spirit is a Substance the most Fine and *Aery* in the whole *Body*; and it may be the immediate Instrument, whereby the *Soul* Acts upon the *Body*.

Spirits are divided into *Natural*, *Vital* and *Animal*. The *Natural Spirits* are such as are generated in the *Liver* of the purest *Blood*, for the support of Nature. The *Vital Spirits* are those generated in the Heart of the *Natural Spirits*; and from thence by the *Arteries*, spread into every Part of the *Body*. The *Animal Spirits* are those generated in the *Brain* of the *Vital Spirits*, which are the immediate Instruments of Sense.

The Parts of the *Body* which contain the Rest, are either Similar or Dissimilar; Similar, as *Bones*, *Cartilages*, *Ligaments*, *Membranes*, *Fibres*, *Nerves*, *Veins*, *Arteries*, *Flesh*, *Skin*.

Dissimilar or *Heterogeneous* Parts are either *External* or *Internal*. External, as the *Head*, the *Trunk*, the *Limbs*. The Parts of the *Head* are the *Skull* and *Face*. The Parts of the *Trunk* are the *Breast* and the *Belly*. The Limbs are the *Hands* and *Feet*. The Internal Parts of the *Body* are such as are in the lower, or middle, or the highest *Ventricle* of the *Body*. The Lower *Ventricle* contains those which we call the *Natural Parts*, which are either for *Nutrition* or *Generation*. Those that are for *Nutrition* are again divided into two *Classes* the first and second.

The first contains the *Gullet* or Neck of the *Stomach*; the *Stomach* it self; the *Intestines* or *Guts*, which are either Small or Great.

The Small ones are *Duodenum*, *Jejunum*, and *Ilion*. The Great ones are *Cæcum*, *Colon*, and *Rectum*; The *Messentery*.

Those of the second Class are the *Liver*, *Milt*, *Spleen*, *Reins*, and *Bladder*.

Those Parts which are for *Generation* are either such as are common to both *Sexes*, as *Testicles* and *Seminal Vessels*; or to either *Sex* apart, which are the *Pudenda*.

The *middle Ventricle* contains the *Vital Parts*, which are the *Heart* and the *Lungs*.

The *upper Ventricle* contains the *Animal Parts*, which in one word is called the *Brain*; wherein we are to consider the *Membranes*, being two, which in Latin are called the *Dura Mater*, and the *Pia Mater*; one thicker than the other, and both encompassing the *Brain*.

The Parts of the *Brain* are two, the former and the hinder; the former hath three *Ventricles*, the *Right*, the *Left*, and the *Middle*.

We come now to the last thing to be considered in *Natural Philosophy*, and that is the *Soul*, which in *Vegetables* is that by which they grow; in *Animals*, that by which they grow and have sense; and in *Men*, that by which they grow and have sense, and are Rational.

The Faculties of the *Vegetative Soul*, which is found in *Plants*, are these Three; First, That by which they are nourished and preserved. Secondly, That by which they encrease and grow bigger: And Thirdly, That by which they generate other *Bodies* of the same Species or likeness.

The Effect or Consequence of the *Vegetative Soul* is Life.

The Nutritive Faculty of the *Soul* is that, whereby it converts another Substance into its own, for its own preservation; so that herein there are Three things necessary, *viz.* something that nourishes, and that is the *Soul*; something which is nourished, which is the *Animate Body*; and something by which it is nourished, which is the *Aliment* it self.

That which nourishes is the *Soul*, wherein it makes use of the *Natural heat* as its Instrument.

That which is nourished is the *living Body*, which as it wastes is still repaired with fresh Nutriment.

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The *Nutriment* it self is such as has a Power, or is capable of being Animated by the same *Soul*, after Digestion and Concoction.

That Faculty of the *Soul*, by which the *Body* grows, has by some been thought to be the same, by which 'tis nourished, because it has the same *Object*, viz. *Nourishment*; the same *Subject*, viz. An *Animate Body*; the same *Efficient Cause*, viz, the *Soul*; and the same *Instrument*, which is *Natural Heat*.

Hence *Scaliger*, and some others, have thought the *Nutritive* and *Augmentative Faculties* of the *Soul* to be the same.

But it appears that they differ. First, In regard of their *End*. The *End* of the *Nutritive Faculty* is only the restoring or supplying of those Parts which are continually consumed and wasted. But that of the *Augmentative* Part is the Acquisition of a just Magnitude or Proportion to do those Operations that are proper to the *Body*.

2. The different *Form*. The *Form* of *Nutrition* is the bare hanging, or Assimilation of the *Nutriment* to the *Body*; But the *Form* of Accretion consists in a Motion of Extension.

3. They differ in regard of the manner of *Mutation* or *Change*. In *Nutrition* there is no *Change* of the *Body* as to its *Place* or *Extension*; but in *Augmentation* there is.

4. They differ in regard of *Time*. The *Nutritive Faculty* indures as long as the *Body* has the same *Form*. But the *Augmentative* no longer than till the *Body* arives at a certain Magnitude.

The third Faculty of the *Vegitative Soul* is the *Generative*, whereby it produces another thing like it self, for the perpetual conservation of its own *Species*, and this is the most noble Faculty of all the three.

Here we are to observe, That nothing that hath Life can have this *Generative Faculty*, except it be perfect in its kind, and not mutilated, or castrated, as *Eunuchs*, &c. And except it self be generated by the ordinary, or Natural way, as all those things that are generated of Putrefaction.

The *Affections* of a *Vegitative Soul*, as well of the *Sensitive* as *Rational*, are *Life*, and *Death*.

Life is the Conjunction or Union of the *Soul* with the *Body*, and consists in an equal temperament or proportion of the Natural Heat, and Radical Moisture.

Death is the Separation of the *Soul* and *Body*, and is either Natural or Violent. Natural, when through length of Time the Natural Heat is perfectly Consumed or spent; and Violent, when the Heat is destroyed by the Force, or Power of any external Agent.

The *Sensitive Soul* is that by which an *Animal*, or *Living Creature* perceives or apprehends those things which are without it (to wit, *Sensible Objects*) so as to desire those things which are for its Preservation, and by which also it is moved from one place to another, so that it hath these three different *Faculties*.

The Cognositive, or that of the Senses.
The Appetitive, or the Faculty of Desiring.
The Locomotive, or the Faculty of Moving up and down.

The *Cognoscitive*, or Faculty of *Sense*, is that whereby *Living Creatures* by the mediation of the Instruments of the *Body*, perceive and judge of *Sensibles Objects*, and direct them to a certain End.

This Faculty is commonly called *Sense*, and its operation *Sensation*.

The *Senses* are either External, or Internal.

The External are *Seeing*, *Hearing*, *Smelling*, *Tasting* and *Feeling*.

The *Internal Senses* are such as retain *Sensible Objects*, and represent them to the *Animal*, or *Living Creature*; not only *Present*, but *Absent*; and are these three, viz. *Common Sense*, *Phantacy* and *Memory*.

The *Affections* of the *Senses* are *Sleeping* and *Waking*. *Sleep* is a binding up (as it were) of all the outward *Senses* in order to the Repose, and Refreshment of the *Body*.

The Remote Cause of it is the *Natural Heat*, which forces gently the Vapours of the *Aliment* received up into the *Brain*: The next cause is the Vapours themselves which are thus raised from the *Stomach*, and *stop* those passages through which the *Animal Spirits* have their course.

The Affection of *Sleep* is *Dreaming*, which is an Apparition presented to the *Body Sleeping* by the Internal Sense.

Some of these are Natural, and they proceed from the Image or reflexion of the *Thoughts*, or *Actions* of the Day; and some are *Supernatural*, and sent either by *God* himself, or *Good Angels*, and do many times presage things to come; or else by the *Devil*, or *Evil Angels* to work and terrifie us, and both these last kinds are proper only to Man.

Waking is the Freedom, or Liberty either of all, or of some of the *Senses*; and the cause of it is either Internal, or External.

Internal, as the finishing of the *Concoction* of the *Meat*, for after *Concoction* and *Separation* made in the *Stomach* the *Vapours* cease, and so the *Body* Wakes, or else the *Native Heat*, which by degrees dissolves and dissipates those *Vapours*, or it may be both together.

The *External Cause* of *Waking* are such outward things or Accidents as may disturb us, as *Noise*, *Motion*, and the like.

The *Appetitive Faculty* is that, whereby the *Animal*, or *Living Creature* is moved to seek that which its Senses tells is good, and avoid that which its Senses represent to it as Evil. This *Faculty* is called the *Sensitive Appetite*, as it is taken for the power of desiring; and the Action it self is called seeking or desiring.

The *Object* of it is every thing that is the *Object* of the *External Senses*, which the Phantasie judges good, and desires them; or Evil, and avoids them.

The *Sensitive Appetite* is either *Concupiscible*, whereby the *Living Creature* is carried to desire any Good which seems pleasant and delightful; or *Irascible*, when it is carried to desire any Good which cannot be obtained without difficulty and labour. The Affections of the *Sensitive Appetite* are either Simple or Mixt; the Simple are either good, as *Joy*, *Love*, *Hope*, &c. or Evil, as *Grief*, and *Fear*.

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The mixt are *Anger*, which is an Affection compounded of *Sorrow*, and desire of Revenge; and its Kinds are *Hate* and *Shame*. Or *Zeal* which is a mixt Affection of *Love* and *Anger*, when the thing Loving is angry with that which offends the thing Loved.

The *Locomotive Faculty* is that whereby a living *Creature* is moved from place to place, either in whole or in part to seek Good or avoid Evil; and in this there are three things required.

(1). That which moves it, which is either the Final or Efficient Cause.

(2). The Bodily Instrument which moves it, which is remotely the *Brain*, whence the *Animal Spirits* Flow into the *Nerves*, which the *Soul* makes use of in moving the *Body*, and Proximately or Particularly the *Muscles*, which are formed so, as to be easily contracted or extended in the performance of all *Locomotion*.

(3). That which is moved, to wit either the whole Body, or some certain part of it, as the *Tongue*, *Hand*, *Foot*, *Eye*, &c.

The *Rational Soul* is the Form of *Man*, whereby he has the Power of *Understanding*, *Reasoning*, and *Willing*.

The Faculties of it are the *Understanding* and the *Will*.

Here they lay down certain *Theorems* or *Speculations*, containing in general Terms the Nature of the *Soul*: As (1) That the *Rational Soul* is a Substance Spiritual, and Immaterial. (2) The *Rational Soul* is Incorruptible, and Immortal. (3) The *Rational Soul* is not the same Numerical thing in all Men.

The *Understanding* is a Faculty of the *Rational Soul*, by which a Man *Understands*, *Knows*, and *Judges* things that are Intelligible.

The Word *Understanding* which the *Latins* call Intellect, is taken for the *Mind*, or *Soul* it self, in which it doth *Understand*.

Sometimes it is taken for a Habit or Knowledge of Principles, and is called in Latin *Intelligentia*.

Sometimes it is taken for the Act of the *Mind* or *Soul*, which in Latin is called *Intellectio*.

Sometimes it is taken for the Faculty of the Power of *Understanding*, and so it is in this place.

The *Understanding* is said to be either *Speculative*, when it takes Knowledge of any thing only for Truths sake, and rests in the bare Cognition. Or *Practical*, which takes Knowledge of a thing, not only for Knowledge sake, but also in order to the doing it, when it considers it a thing to be done; and hence it begins to move the Appetite, not by compelling, but by directing and shewing it what is to be done.

The Operations of the Intellect, or *Understanding*, are these three, (1) The *Apprehension* of simple things, when a Man conceives only one thing alone, as the *Heaven*, the *Earth*, a *Man*, a *Beast*, &c. (2) *Composition* and *Division*, when simple Conceptions are joyned together, so as something is affirmed or denyed, but yet without any Discourse or Reason; as when he conceives that a Man is a *Living Creature*. (3) *Discourse* or *Reasoning*, when the *Understanding* gathers one thing from another.

And here we are to take notice, that Sense is only concerned, and only comprehends Singulars, but the *Understanding Universals*: As also, That nothing is in the *Understanding*, which was not before in the *Sense*.

The *Will* is a Faculty of a *Rational Soul*, whereby a Man desires, or avoids things known from the *Understanding*, and this is called the *Rational Appetite*.

The *Object* of it in general is any thing which is Represented by the *Understanding*, as Good; and also its contrary, any thing which is represented to it as Evil.

The *Will* is either Simple or Determinate. Simple or Universal is that whereby a Man is carried to every thing that is good in General, whether Real or Apparent.

Determinate or *Particular*, is that whereby our Will is determined upon this or that particular Object.

And thus much in Brief of the *Philosophy* of the *Antients*. Now follows a short or Brief Discourse of the Doctrins of the *Modern Philosophers*, wherein they Receed from the *Antients*.

A

A BRIEF ACCOUNT OF Des Cartes's Philosophy;

BEING

The New and general Received Philosophy.

IN all *Sciences* there are certain *Principles* or *Postulata's* supposed, upon which the whole Frame or Contexture of the Work depends. In this Philosophy *Des Cartes* hath made use of new ones distinct from all that ever have handled that Subject before him.

He calls his Book the *Principles of Philosophy*, which he has divided into four several Parts.

The first concerns the *Principles of Human Knowledge*, wherein he shews, that they who enquire after Truth, must once doubt of every thing in the World, even of *Sensible Things*, and *Mathematical Demonstrations*.

Of *Sensible Things*, because we find the *Senses* often err; and also because in our *Dreams* we often think we see those things which neither are, nor ever were: and there are no certain *signs* to a Man thus doubting, whereby he can distinguish *Sleeping* and *Waking*.

Of *Mathematical Demonstrations*, because we can have no certainty of the truth of our *Faculties*; But that we our Selves really are he proves, because we *Think*; for even our *Doubting* or *Thinking* necessarily supposes or implies something that doth *doubt* or *think*.

And hence he infers, That our *Minds* are more cognoscible or obvious to our *Knowledge* than any *Substance* or *Body*; because by their help and assistance it is, that we come to understand *Bodies* with all their *Notions* and *Affections*, and the more we learn of the Nature or Being of our own *Minds*.

Nor can we (as he saith) having *finite Minds*, judge or comprehend any thing rightly concerning *Infinity*. And hence it is, that we are always at a loss about Infinite Extention of *Body* or *Space*, and Infinite Divisibility of *Matter*; and hence he would teach to distinguish betwixt *Infinite* and *Indefinite*. And then he concludes his first *Book* of *Principles* with shewing the Principal Causes of all *Errors*, which he reduces to these Four:

1. The first are the Prejudices of our *Infancy*, before we come to the right use of our *Reason*.

2. The second Cause of *Error* is, because we can't forget or drive out of our *Minds* those Prejudices.

3. The third is, That we weary and busie our selves in attending to those things that are not present or obvious to our *Senses*; and so we do not judge of them from our own *Perception*, when present; but from a former conceived *Opinion* or *Imagination*.

And 4. The Fourth and last Cause of *Error* is, That we tye our Conceptions to *Words* and *Terms*, which do not rightly and justly answer the Nature of things.

His *Second Part* of *Philosophy* treats of the Principles of *Material Things*.

Here he proves the Existence of *Things Material*, or such as are without us, because they do affect our *Senses*. Now we can't make out Selves perceive one thing more than another, so that this Affection of our *Senses* must needs proceed from the *Things* themselves, and consequently those *Things* must be.

He places the Nature or Essence of *Matter* in its *Extension*, and not in any other of its Affections; and hence takes occasion to shew the Prejudices which we commonly have of *Rarefaction* and a *Vacuity*.

His Notions of *Place* and *Motion* are also new; to which he adds (after he has spoken *God* as the *first Cause* and *Mover* of all Things) the *Laws* of *Nature*. And in short In this Book of his *Principles* he shews that, which in *Aristotle's Philosophy* is called, The *Affections of Body in general*.

His *Third Part* treats of the *Visible World*, and of its several Parts.

He places the *Sun* in the *Center*, and supposes all the rest of the *Planets* to be moved about it.

And

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And according to this *Hypotheſis* he ſolves all the ſeveral *Phænomena* of the *Earth*, the *Planets*, *fixed Stars*, and the like.

Afterwards, for the Expoſition of the *Phænomena* of *Nature*, he aſſumes certain *Principles*; to wit, That one part of the *Matter* or *Subſtance* of the *Heavens* conſiſts of many little Particles, and theſe he calls his *Globuli*. And then about theſe *Globuli*, or little Parts, he places another *Matter*, whoſe Parts are much leſs and much more fluid; and theſe he calls his *Materia Subtilis*, which fills up the *Corners* or *Spaces*, as he ſuppoſes, amongſt his *Globuli*. And then he ſuppoſes ſome other Parts of *Matter*, whoſe *Figures* are not ſo apt or fit for Motion; and theſe he calls his *Particula Striatæ*. And out of theſe three, as out of ſo many *Elements*, he ſuppoſes all *Bodies* to be made.

According to this Suppoſition he expounds the Nature of *Light*, and how it is diſperſed by the *Sun*, and the reſt of the *Luminary Bodies*; as alſo the Nature of the *Comets*, with their Motions.

He aſſigns every *Star* and *Comet* its ſeveral *Vortex* or *Whirl-pool*; and according to that Suppoſition, he demonſtrates their *Spots* and *Changes*.

According to his own *Principles*, he ſhews how all the *Bodies* might at firſt be generated; and gives an Account of their ſeveral *Changes* and *Revolutions*, together with the Reaſon of the Equality of thoſe *Motions* which are found in all *Bodies*.

His *Laſt Book* of *Principles* contains a Diſcourſe of the *Earth* and *Sea*, with the Nature of the ſeveral *Bodies* therein. And here he gives you his Notion of *Gravity* and *Levity*, and tells you why *Bodies* are not *heavy*, according to his, as well as *Ariſtotle's Hypotheſis*, in their own Natural places. How it comes to paſs, that *heavy Bodies* tend towards the *Center* of the *Earth*, whence proceeds the *Flux* and *Re-flux* of the *Sea*, and how it comes to differ upon ſeveral Shores, and how it comes to paſs that there is none in *Pools*, *Lakes*, and *ſtanding Waters*.

He treats alſo in this Book concerning *Heat*, *Vapors*, *Spirits*, *Exhalations*, and the *Saltneſs* or *Freſhneſs* with the different Taſts of *Water*.

He treats likewiſe of *Metals* and *Minerals*; of *Fire*, and *Combuſtible Bodies*; of the Motion of *Nitre*, and the ſpreading of *Gunpowder* when ſet on fire; of the *Load-Stone*, and how it is that it draws *Iron* to it; as alſo of the Attractive Power of *Jet*, *Amber*, and ſuch like *Bodies*.

And in the Latter end of this Book, he treats of the *Senſes*, both External and Internal; wherein his *Notions* are all New and Curious. And indeed the Deſign of *Philoſophy* being principally to quicken and perfect the *Judgment*, this of his being of a more fine and ſublime Nature than that of *Ariſtotle's*, and the other Old *Philoſophers*, muſt certainly very well deſerve Reading, eſpecially ſince (as he tells us) he hath omitted nothing in *Nature* (yet excepting thoſe things which *Philoſophers* in former times uſed to call *Occult Qualities*) whereof he hath not given an Account, or at leaſt laid down ſuch *Principles* in his Diſcourſes upon other Subjects, that any of thoſe may eaſily be ſolved by them.

And whereas ſome may poſſibly think his *Hypotheſis* (eſpecially about the *Creation*, wherein *Moſes* is very particular) may ſeem to be different from all received Doctrines of the *Church*, he at laſt entirely ſubmits all his Writing to her Cenſure.

ARITH.

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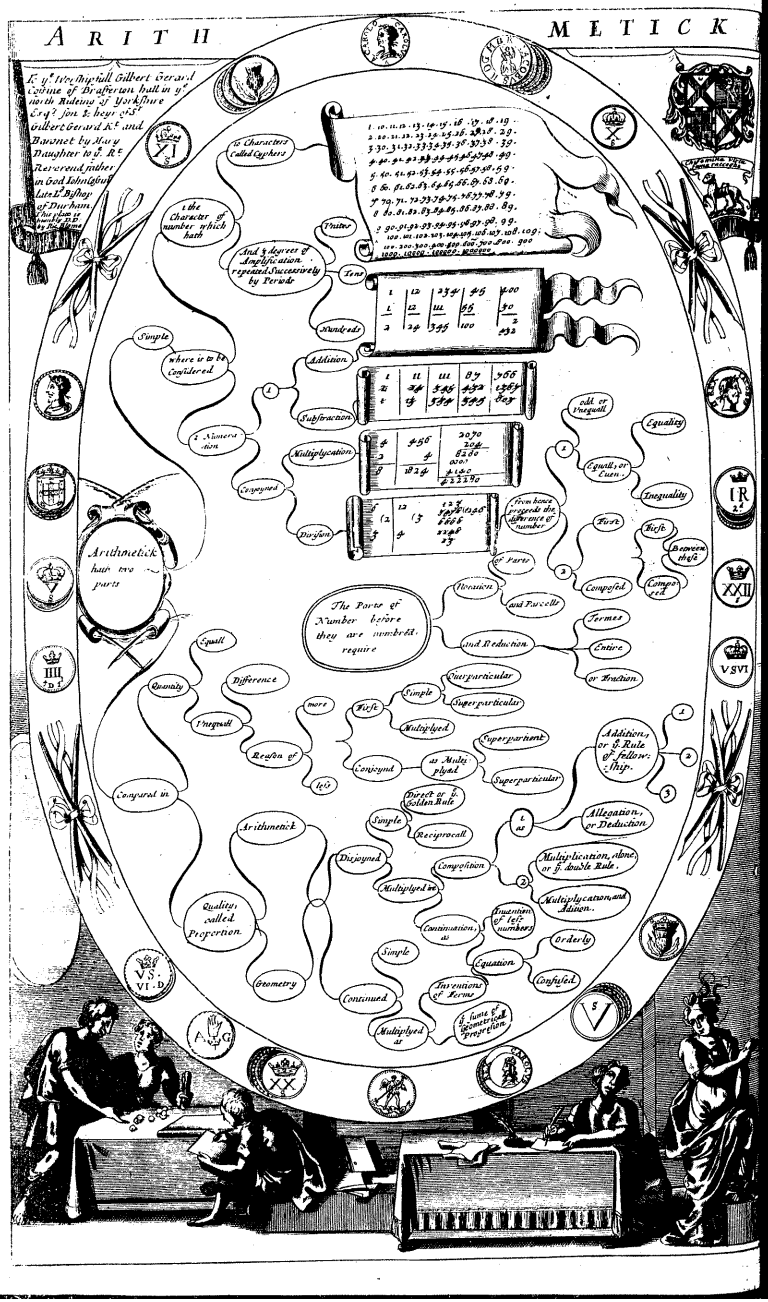

ARITHMETICK.

ARITHMETICK is the *Art* of well numbring, which is divided into two parts, Simple and Compound.

The simple is that which simply considers the Nature of Number.

Number is that by which every thing is counted, either by an intire Number, or by Parts, where first must be considered the Notation, and then the Numeration.

The Notation of Number has 10 Characters, *viz.* 9 Digits, or Figures, and a Cipher, and they are these, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0. And three Degrees of Amplification repeated again in like manner by Periods, once, ten times, a hundred times, for every Character of a Number when put in the last place of the whole Number, expresses its Number once; If in the last place but one, ten times, and if in the last place but two, a Hundred times. This is then the consideration of the first Period; the second is of *Thousands*, and tens of *Thousands*; as in the fourth place we count 1000, in the fifth place 10000, and in the sixth 100000, In the third Period 1000000, 10000000, 100000000; So likewise in the fourth Period, Thousand of Millions, where there are also three Degrees which are repeated in like manner with the rest, and so to Infinites.

Numeration finds by two Terms proposed a third, and if it can't be performed altogether, makes use of Induction of parts; for 'tis the same thing to Account by the whole as by parts; besides every Character is considered distinctly and by it self, and if it serve to the following Numeration, it must be born in Memory to avoid greater Trouble.

Numeration is either Primary, or conjoyned, the first, or principle is that which joyns once one number with another, as Addition and Subtraction.

Addition is the first Numeration, by which one number is added to another, and afterwards the Total is gained. Addition is either of Numbers conjoyn'd (which is the first and most easy part by which the Total ariseth); or separate. In which sort of Addition the Mediation of the Table of Numbers is to be considered; and first in Characters single amongst themselves, where the single may be easily added with the single.

Subtraction is the first Numeration, by which one Number is taken away from another; and then presently the remainder is found.

Conjoyn'd Numeration, compounds Number with Number as often as it may be proposed, which is Multiplication or Division.

Multiplication is that by which the Number that is Multiplyed is adjoyned or made use of, so often as the Unite is contained in the Number which Multiplies; and so the Product of both is found.

Division is that by which the Divisor is so many times taken from that which must be divided, as it is contained, and then you have the Product which is called Quotient.

From *Division* proceeds the difference of Number equally even and uneven. An equal or even Number, is that which may be divided into two parts without Fraction, as 2, 4, 6, 10, 16. An unequal or odd Number is that which cannot be divided without Fraction, as 3, 5, 7.

Again, an Even Number is subdivided into equally even, or equally uneven, and into unequally uneven.

An equally even Number, is that which may be divided into equal parts, to 1, as 4 is divided into 2 by 2, and 2 by 1. In like manner 32 into 16, 16 into 8, 8 into 4, 4 into 2, and 2 into 1.

Equally uneven is that which can only once be equally divided, as 10, 30, 50. Unequally even is that which has several equal parts, but can't admit of Division as far as to one, as 12, 24, 36, 48.

Secondly Number is principal, or compounded; A principal Number is not divided by another Number of Multitude, as 3, 5, 7, 11, 13, and others; It is also called an uncompounded Number, that is to say, it doth not consist of any other Number of Multitude.

A Compounded Number is that which may be divided by another Number of Multitude, as 4 is divided into 2 by 2.

From these ariseth another difference of Number, *viz.* principals, and compounded between themselves; The principal Numbers between themselves, are such as are not commonly divided by any Number of Multitude, as 2 and 3, 5 and 6.

Compounded Numbers amongst themselves, are such which are frequently divided by a Number of Multitude, as 4 and 6 are compounded between themselves; because they are commonly divided by 2, which is a Number of Multitude.

But before the Parts of Number be Counted, they require some proper Notation and Reduction.

Notation is of the Parts which has only two Marks, which are separated by an interposing Line, the Number above is called the Numerator, that below be Denominator.

Reduction is of Terms, Intigers and Parts.

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Reduction of Terms is made of the least Term proportionate, and is General or Special; the General is a Division of Terms composed amongst themselves, by the greatest and most common Divisor, as 8 by 4: Special by the Species of Numeration to the Terms of two parts.

Reduction of Integers is a Multiplication of Integers by the Name of the parts.

Reduction of parts or Fractions to Integers, is a Division of parts by its own Name; Reduction of Parts to Parts, is a Multiplication of Terms, by a Name Alternate to two proportionals of the same Name.

Reduction of Parts to Equal Unites, is a Reduction of several Parts.

The other compounded Part of Arithmetick, shews the Composition of Numbers in Quantity and Quality.

The Terms of the *Ratio* of a compounded Number are called Antecedent, and Consequent; the Antecedent is is the first Term of the *Ratio*, or Reason; the Consequent is the second.

Composition in Quantity is either of Equality, which is alone, and individual, as 1 to 1, 2 to 2, from 4 to 4; from 9 to 9; or of Inequality which is called difference, or *Ratio*.

Difference is a Composition of as much as a Term, differs from a Term; and so it is known by Subtraction; so the difference of 2 to 3, of 3 to 5, and of 5 to 8 is 1, 2, 3.

The *Ratio* is a Composition so long as one Term is contained in another, and therefore it is known by Division; and so after the *Ratio* or Rule is given, the Terms are known by contrary Multiplication, as the *Ratio* of 3 to 2, is 2 and a half, because 3 contains 2 once and a half. The *Ratio* of inequality is either more or less. The *Ratio* of the greater inequality is Termed the Major-Term, but of the lesser by putting the word *Sub* before, as the *Ratio* of 2 to 1 is called double, of 1 to 2 Subduple.

Ratio is either Primary or conjoynd, the first has a Species of *Ratio*, and is simple, or Multiplyed; simple when the Major Term contains the lesser but once and something more, as the Superparticular and Superpartient.

The Superparticular *Ratio* is when the Term comprehends one Term once, and one part more; so one Second, Third, Fourth, or Fifth is called a second and a half, a third and a half, a fourth and a half, a fifth and a half, and so of others; as for Example { 3, 4, 5. / 2, 3, 4. }

The Superpartient *Ratio* is when one Term comprehends another, once and some part over and above, so 2 thirds, 3 fourths, 4 fifths is called Superbipartient third; Supertripartient fourth, supercuadripartient fifth, and so of others; as for Example { 5, 7, 9. / 3, 4, 5. }

The Multiplyed *Ratio* is, when one Term exactly contains another more than once, so twice, thrice, four times is called the Double, Triple and Quadruple Rule, as { 2, 3, 4. / 1, 1, 1. }

The conjoyned *Ratio* is that which contains divers sorts of *Ratio*'s, as the manifold Superparticular *Ratio*, when one Term contains another more than once, and some part more, as a *Double Sesque* Second, a *Triple Sesque* Third, a *Quadruple Sesque* Fourth, as for Example { 5, 10, 17. / 2, 3, 4. }

The Multiplyed Super-partient *Ratio*, is when one Term contains another more than one, and several parts more, as the double Superbipartient third, that is 2 and ⅓, the Triple Supertripartient fourth 3 ¼, the Quadruple Superquadripartient fifth 4 ⅕, as for Example 11/4 21/5.

The Comparison of Number in quality is called proportion, which is either *Arithmetical*, or *Geometrical*.

Arithmetical proportion is an equality of differences; *Geometrical* proportion is in the equality of the *Ratio*; this is properly the Portion of Numbers, and are called proportionable Numbers, as 3,6,4,8.

Partly direct as 3 to 6, so is 4 to 8; partly reverst as 8 to 4, 6 to 3, and alternately as 3 to 4, 6 to 8.

Proportion is separate or continued; proportion separate or disjoyn'd, is that in which there are actually 4 Terms, as 12, 8, 6, 2, for throughout the difference is 4.

Proportion conjoyn'd, or continued, is that whose middlemost Term, is compared to all the Extreams, which also is comprehended in 4 Terms, as in 8, 6, 4, the differences are equal, for the Number of 2 is throughout, and the middlemost is taken twice, for as 8 is to 6, so is 6 to 4.

Separate proportion is Simple, or Multiplyed; the simple is in 4 Terms and is direct, as the *Golden Number* so called from its singular use, in which amongst many other things is chiefly comprehended all the Invention, and supputation of *Parts* and *Ratio's*; where it is reciprocal, when it is as the First Term of the First *Ratio*, to the First Term of the Second *Ratio*, so the Second Term of the Second *Ratio*, is to the Second of the First.

Separate Multiplied Proportion is when more than Four Terms are used in *Compofition*, or *Continuation*; Composition of Terms is either *Primary*, *Secondary*; *Primary* as *Addition*, and *Alligation*.

Addition, which is called the *Rule of Fellowship*, is when the Terms of *proportion* given are added, and is Triple 1, 2, 3; the First is the Addition of the Antecedent with the Consequent, to the Consequent, as 4 to 3, so 8 to 6; then as 7 to 3, so 14 to 6. The Second is an Addition of divers to one Consequent, or of one Antecedent to divers Consequents, as 2 to 4, so 3 to 6, and 8 to 4. The Third is an Addition of all the Antecedents to all the Consequents.

Alligation, or *Deduction*, is a mixture of the, several kinds, whereof the Mean is tempered.

Alligation is of a Mean either acquired, or given; the *Alligation* which seeks the Mean is that, which having the Terms propofed seeks the Mean in the Division, of those which are added by their Number, as if there are 2 Terms by 2, 3 by 3, and so consequently. The *Alligation* which gives the Mean

Mean is the *Equation* of the Mean proposed by reciprocal differences to that of unequal Terms.

The second Composition of Terms is made by the Multiplied Terms, when for 2 simple we take 2 which are made by them.

Multiplication is sometimes alone, which is Vulgarly called the *Double Rule*, or the *Rule of Six quantities*. Sometimes there is both *Multiplication* and *Addition*, which First Multiply the Terms proposed, and afterwards add together those that are Multiplied.

Proportion continued by the Terms is when any Term of the Antecedent *Ratio* is continued to the consequent, as the Invention of less Numbers into proposed *Ratio's* and *Equation*, that is, the continuation of two proportionate Orders in two Numbers, which is orderly, or confused.

Orderly Equation is that which is according to the same order of Numbers, so the First are proportionable to the Second, the Second to the Third; as for Example, 2/3, 4/6, 1/2, for as 9 is to 6, so is 12 to 8; and as 6 to 3, so is 8 to 4.

Confused Equation is when all as the First of the First Order is to the Second, so the Second of the Second is to the Third; and as the Second of the First is to the Third, so the First of the Second is to the Second; as for Example, 2/12, 1/8, 6/3, for as 9 is to 8, so is 18 to 16; and as 8 is to 6, so is 24 to 8.

Proportion continued is when the whole *Ratio* of the First Term is to the Second; In like manner it is of the same with the Second to the Third, as in 2,4,8.

Proportion continued, as separated, is simple in Three Terms, or Multiplied in those which are long continued, as the Invention of Terms, and the sum of the *Geometrical Proportion*, and so the *Ratio* of the First to the Second is doubled to the Third, tripled to the Fourth, and so consequently in less, as in 1, 2, 4, the *Ratio* 1 to 4 is the First *Ratio* doubled to the Second, that is to say, twice put down and so Multiplyed by it self. So much for the Invention of continued, or conjoyned Numbers: Here follows the sum of *Geometrical Progression*.

If the First is taken from the Second and Last, it will be as the Remainder of the Second to the First, so the Remainder of the Last to the Last all preceeding; and then if 4 (which will be equal to the Remainder of the Last, as the Remainder of the Second to the First) be added from the whole to the last, the Sum will be as here 2, 5, 1, taking 2 from 4, and from 8 as 2 which remain of the Second are to the first (so 8 which remain of the Last) are to 4, and the two preceeding; for there is an Equality throughout, as 2, 2, 6, 6, are proportionable, the which 6 being added to 8 which is last, the Sum of the Progression will be 14.

Amongst the many Assistances I received from several Experienced Persons, for the building up this *Volume*, I had this following *Compendious* Tract of *Arithmetick* recomended unto me by a Person of Honour, as worthy to be inserted for its Excellency, being (*Multum in Parvo*) which said Tract I was the rather induced to insert as being Composed by an Ingenious Gentleman that has freely contributed his assistance in some other parts of the *Mathematicks*, and in particular in *Fortification*, wholly composed by him. The said Tract is as followeth.

NUMERATION.

Numeration is a Series of Numbers by a Decimal Progression, every place towards the *Left-Hand* being 10 times the Value of the next place to the Right.

The best way of reading any Number is to distinguish them into Hundreds, as in this Example, 986, 157, 4321 Or Nine Hundred Eighty Six Million, a Hundred Fifty Seven Thousand, Four Hundred Thirty two; and so of any other Number.

ADDITION.

HAving placed the *Unites* of the respective *Progressions* in *Ranks* and *Files*: begin and add together the *Unites* of the *Right-Hand File*, setting down the Sum underneath (if it be under 10), but if just 10, then set down a *Cipher* (viz. 0) and carry 1 to the next place, and if above 10, set down the Excess, and carry for every 10 an *Unite*.

To add	24	2374	587
	14	1067	
		3399	345 Proof.
Sum	38		234
		3840	

1. Product 1146
2. Product 579 Subtract.

567 Remains.

The reason of this is nothing else than all the Parts added together make up the Whole, as in the *Line a, c, a, b, (14)*, and *b, c, (24)*, together make the *Line a, c, (38.)*

14 b 29

a ——— c.

38

The best proof of *Addition* is thus; After you have added all the Numbers, cut off the first *Line*, and then add the rest; then *Subtract* the one *Product* from the other, and the Remainder is equal to the upper Number, for the Product of the one *Addition* is lesser than the other by the First Number only, therefore their difference must be equal to the First Number.

In *Numbers* of divers *Denominations*, when the Sum of them amounts to an *Integer*, or *Integers* of the next greater *Denomination*, add these *Integers* to those of the next *Denominations*.

4 *Farthings* make a *Penny*; 12 *Pence*, a *Shilling*; and 20 *Shillings* a *Pound*.

7 92/100 Inches make a *Link*; 160 square *Links* a *Pearch*; 40 *Pearch* a *Rood*; and 4 *Rood* an *Acre*.

SUB-

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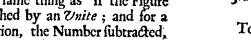
SUBTRACTION.

HAving placed the leſs Number under the greater, according to their reſpective *Progreſſions*, begining at the *Right-Hand*, *Subtract* the lower *Figure* out of that above it ſet down, the Remainder under it; but if the *Figure* chance to be leſs, then there muſt be a *Unite* borrowed from the next place, or *Progreſſion* to ſupply the defect, which muſt be paid again by adding one *Unite* to the next lower Figure on the Left-hand, which is the ſame thing as if the Figure above it was diminiſhed by an *Unite*; and for a Proof of the Operation, the Number ſubtracted, and the Remainder muſt ſtill take that out of which it was ſubtracted.

For out of a Number *a, c,* let a leſs Number *a, b,* be Deducted; then by the *Hypotheſis a, b,* with the Remainder *a, c,* are equal to the whole Number *a, c,* ſeeing the parts united are equal to the whole,



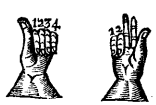
From	28	34	405
Subtract	15	7	26
Remain	13	27	379
Proof	28		405

In Numbers of divers *Denominations*, when the Number to be Subtracted is greater than the other, then Borrow one from the next *Denomination*.

MULTIPLICATION.

FIrſt, To Multiply any Number betwixt 30 and 100. In the two Numbers propoſed you are to obſerve how many *Unites* each of them wants of 10; then (all your *Fingers* being open) lay down ſo many *Fingers* as the Numbers want of 10.

Note, All that ſtand up are *Tens*, thoſe that are down Multiplied one by another are *Unites*, which added to the *Tens* gives the Number, or Product deſired, as in this Figure and Example, 6 times 8 is 48.



Place the Numbers one under the other, as in *Addition*, then Multiply the laſt Right-hand *Figure* of the *Multiplicand* by the ſame of the *Multiplicator*, and ſet the *Product* (if leſs than 10) under; but if greater, carry the *Exceſs* (that is, for every 10 one *Unite*) to the next place: And if the *Multiplicator* have more places than one, ſet down the firſt *Figure* of each reſpective *Product* under that *figure* of the *Multiplicator*, by which it was made, and ſo on to the Left, obſerving *ranks* and *files*.

	CM.	XM.	M.	C.	X.	V.
				4	2	6
				3	2	7
1. Product				4	2	
			1	4	0	
			2	8	0	0
2. Product			1	2	0	
			4	0	0	
			8	0	0	0
3. Product			1	8	0	
			6	0	0	0
Total Sum	1	3	9	3	2	2

426 Multiplicand.
327 Multiplicator.

2982 Firſt Product.
852 Second Product.
1278 Third Product.

139332 Sum of all the Products.

The reaſon of which (as in the *Table*) is, that if all the particular Sums of the *Products* of the *Multiplicand*, ariſing from each *Multiplicator* be ſet down and added together, they will equal the Sum of all the *Products* taken together.

Example.

If a *Souldier* having Weekly 7 *Shillings*, how many *Shillings* muſt you have to pay 7693.

7693
7
53851 *Souldiers* to Pay.

DIVISION.

Diviſion is nothing elſe but the Deducting a leſs Number from a greater, as oft as may be, and ſo finding at laſt the Number, by whoſe *Unites* that leſs Number being repeated, makes a Number equal to the greater, or near to it.

The greater Number is called the *Dividend*, the leſſer the *Diviſor*, and the laſt the *Quotient*.

Set the Figures of the *Diviſor* under an equal number of *figures* of the *Dividend* on the Left-hand; if thoſe *figures* of the *Dividend* be of greater, or at leaſt of equal value with thoſe of the *Diviſor*; otherwiſe you muſt place the firſt *figure* of the *Diviſor* under the ſecond of the *Dividend*: Then having ſet down the *Diviſor* right, make Points over the *figures* of the *Dividend* from the *Unite* place of the *Diviſor* inclusive; the number of Points denote the number of *Figures* in the *Quotient*.

For facilitating the *Diviſion* prepare ſuch a *Table* (if your Number to be Divided, or your *Diviſor*, conſiſt of many *figures*) as this following, by

by which you may find how often the *Diviſor* is contained in the *Dividend*, or the reſpective *figures* in it; by which Multiplying the *Diviſor*, deducing the *Product* out of the upper *figures* of the *Dividend*, what Remains muſt be conſidered in the next Operation, if there be more places than one in the *Dividend*: The next *figure* of the *Dividend* muſt be taken down, and ſet next to the Remainder (if there be any,) and the *Diviſor* muſt be again ſet under, if the value of the upper *figures* be ſufficient; if not, there muſt be a *Cipher* ſet in the *Quotient*, and then the next *figure* of the *Dividend* taken down, and the very ſame Operation repeated until the Work be done.

. . . . . .

Dividend 139302 (426 Quotient.
323
Diviſor 1308
00850
327
654
1962
327
1962
000

Table.

1	327 Diviſor.
2	654
3	981
4	1308
5	1835
6	1962
7	2289
8	2616
9	2943

The Reaſon of the *Table* is, if you Multiply the *Diviſor* by 2, and you would find the double value of it; if you add the double value to the *Diviſor*, you will find the Triple, and ſo on.

REDUCTION.

Reduction is performed by *Multiplication* and *Diviſion*, in bringing all ſorts of *Coins*, or *Meaſures* to a greater or leſſer Species; that is, to a leſſer by *Multiplication*, and to a greater by *Diviſion*. As for Example, 20 *l.* Multiplied by 20 *s.* makes 400 *s.* and 400 *s.* divided by 20 *s.* makes 20 *l.*

The GOLDEN RULE.

THis *Rule* is either Single, or Double.

The Single *Rule* of *Three* is when three Numbers are given, and a fourth demanded; and it is either Direct, or Inverſe.

The ſingle *Rule* of *Three* Direct is when three Numbers are given, and a fourth is demanded, which bears the ſame proportion to the third as the ſecond doth to the firſt. For Example, If four *Acres* of Ground coſt 80 *l.* what will eight coſt of the ſame Ground.

Note, That in all Queſtions the ſeveral *Coins* and *Meaſures* muſt be expreſt, and made known.

Secondly; The Number to which you are to find a Proportion, muſt be the laſt in order.

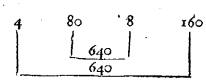
Thirdly, The Number which is like in quantity to that whereunto you are to find a Proportion, muſt be firſt ſet down, and if it be not alike in quantity, it muſt be brought to it. As if 7 *l.* maintain 15 Men a *Month*, how many will 9 *l.* 10 *s.* maintain: Here the *Pounds* are to be brought to *Shillings*.

Having ſtated the *Queſtions*, they are to be reſolved thus:

Firſt, If the Number that asketh the Queſtion be greater than that of the ſame *Denomination*, and alſo require more, or if it be leſs, and yet require leſs; then the Number which is of the ſame *Denomination* with the Number asking the Queſtion is the *Diviſor*, and the *Rule* is *Direct*: But if the Number that asketh the Queſtion be greater than that of the ſame *Denomination*, and requires leſs, or if it be leſs, and requires more; then the Number asking the *Queſtion* is the *Diviſor*; and if thus, the *Rule* is *Inverſe*.

The Reaſon of the Operation of the *Direct Rule* is demonſtrated from the 19*th Propoſition*, *Lib.* 7. *Euclid. viz.* If there be four Numbers in Proportion, the Number produced of the firſt and fourth is equal to the Number produced of the ſecond and third; and if it be ſo, then theſe four Numbers ſhall be in Proportion, as in the *Example*, the fourth *Term* found, 160 being Multiplied by 4 (the firſt *Term*) the *Product* will be the ſame with the *Product* of the third, Multiplied by the ſecond, *viz.* 640.

Wherefore if the *Product* of the ſecond and third *Terms*, *viz.* 640, be divided by the firſt, *viz.* 4, the *Quotient*, *viz.* 160, is the fourth Proportional.

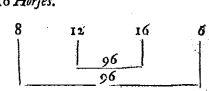


The SINGLE RULE of THREE Inverſe.

THis *Rule* is when there are three Numbers given, and a fourth demanded, which bears the ſame Proportion to the ſecond, as the third to the firſt.

Example.

If a quantity of *Hay* will keep 8 *Horſes* 12 Days, how many Days will the ſame quantity keep 16 *Horſes*.



The ſame Proportion 8 *Horſes* bears to 12 Days, ſo do the 16 *Horſes* to 6 Days.

The DOUBLE RULE.

THis *Rule* is when there are five *Terms* given, and a ſixth in Proportion to them is demanded; As if 4 Men ſpend 19 *l.* in 3 *Months*, how many *Pounds* will 8 Men ſpend in 8 *Months*.

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Of the five Numbers given, three imply a *Suppoſition*, and two more a *Queſtion*.

For ranking the *Terms*, obſerve amongſt the *Terms* of Suppoſition, which of them is of the ſame name with the Number ſought, and place that *Term* in the Middle, or ſecond Place, write the two other *Terms* of Suppoſition one above the other in the firſt Place, and the *Terms* of demand one above the other in the laſt Place, in ſuch manner that the uppermoſt may have the ſame Denomination with the uppermoſt in the firſt Place; as thus,

Men 4——19——8 *Men.*
Months 3——00——8 *Months.*

There it is reſolved by two *Single Rules* of *Three*, obſerving ſtill the above-mentioned Rules.

4 19 8 38 — 152 — 152

3 38 9 114 — 342 — 342

FARCTIONS.

IF in the *Diviſion* of the Operations there remains any thing, then the Remainder is the *Numerator* of the *Fraction*, whoſe *Denominator* is the *Diviſor*, and doth expreſs one of the *Integers* in the *Quotient* into ſo many parts, the value of which in the known parts of one *Integer* is found by Multiplying the *Numerator* of the *Fraction* by the Number of known Parts of the next inferiour Denomination, which are equal to the *Integer*, and divide that *Product* by the *Denominators* in that inferiour Denomination.

And if there happen to be any *Fraction* in the *Quotient*, you may find the value thereof in the next inferiour Denomination by the ſame *Rule*; and ſo proceed till you come to the leaſt known Parts; ſo the value of $\frac{1}{12}$ of a *Pound* will be found in *Shillings* and 3 *d.viz.* Multiply the *Numerator* 9 by 20 (the Number of *Shillings* in a *Pound*) the Product 180 which divide by the *Denominator* 16, the *Quotient* is 2 *Shillings* $\frac{3}{4}$, Parts of a *Shilling*, which by the former *Rule* is found in value 3 *d.*

To reduce a *Fraction* to its leaſt *Terms* is by finding the greateſt common *Meaſure* of both the *Fractions* (that is the greateſt Number which will meaſure or divide each of the given Numbers without a Remainder) which is thus found; divide the greater Number by the leſs, then divide the laſt *Diviſor* by the Remainder (if there be any) and ſo continue dividing the laſt *Diviſors* by the Remainders until there be no Remainder (neglecting the *Quotients*) ſo is the laſt *Diviſor* the greateſt common Meaſure to the given Numbers.

A ſingle *Fraction* is reduced to its leaſt *Terms* by dividing the *Numerator* and *Denominator* by their greateſt Common Meaſure, then the *Quotients* will be the *Numerator* of the *Fraction*, equal to the former, and in the leaſt *Terms*.

117 (132
91
26
13 laſt Diviſor.
26
00

$\frac{91}{117}$ by 13 — 91 (7, 13, 00 — thus 117 (9, 7, 13, 9, 00

When the *Numerator* and *Denominator* are Even Numberst, hey may be meaſured by two.

Note, The *Rule* of *Three* is to be proved by *Tranſpoſition*, *viz.* the laſt Number in the ſum muſt be ſet firſt in the *Proof*, and the firſt laſt; the *product* found in the Middle place. Then working as is before taught, the middlemoſt Number will come forth (if it be right performed); you muſt alſo in the *Proof* draw into the *Multiplications* the Remainder of the *Diviſions*, as in the Examples following.

Examples to Exerciſe the GOLDEN RULE.

Firſt for the Direct Rule.

1. IF 1 *lb.* of *Powder* coſt 4 *d.* What will 595 Pound coſt? — 18, 4, 18, 4760, 595 — (2 (1, 10710 2677 (22 3, 4444 1222 (11, 11

Anſwer 2 *l.* 3 *s.* 1 *d.* 2 *l.*
Tranſpoſition, or *Proof.*
If 595 *lb.* 2 *l.* 3 *s.* 1 *d.* 1 *lb.*

2. If of one Circle the *Diameter* being 7, the Circumference 22 *Inches*, what is the Circumference of a Circle whoſe *Diameter* is 75 *Inches*?

Proof.

7——22——75 — 22 — 150 — 150 — (5 — 1650 (235 $\frac{1}{7}$ — 777

75——235$\frac{1}{2}$——7 — 7 — 1650 — 525 7 — 11550 (22 — 5255 — 52

Note, that in ſuch Queſtions with *Fractions*, you muſt Multiply the firſt Number by the *Denominator* of the *Fraction* of Second and Third Numbers; and the *Fraction* of the firſt muſt be ſet down under the ſecond Number, that all may be reduced equally, as in the fore-going, and this Example.

If one Man work one Day 3 $\frac{1}{2}$ *Rod*, how much will 10 Men work in one Day?

$\frac{1}{4}$——3 $\frac{1}{2}$——10 — 15 — 15 — (2 — 150 (37$\frac{1}{2}$ — 44

10——37$\frac{1}{2}$——1 — 2 1 — 20 — (2 — 75 (3$\frac{1}{2}$ — 20

For

For the Inverſe Rule.

If 3 Men work a *Raveline* in 72 Days, in how long time will 18 Men work the ſame?

Proof.

3——72——18 — 3 — 246 (12 Days. — 188 — 11

18——12——3 — 12 — 36 — 18 — 261 (72 Days. — 33

There is a *Caſtle* beſieged, which is ſufficiently Victualled for 12 Months, 10 Ounces of *Bread*, 7 Ounces of *Cheeſe*, and 3 Ounces of *Butter* every day. The *Governor* is advertiſed, that if the *Caſtle* can hold out 15 *Months* with the ſame *Proviſions*, that the Siege ſhall be raiſed; How much then ſhall be allowed to every *Souldier* a Day, that they may be able to hold out the time?

12···10···15 — 12 — 120 — 15 — (8 Ounces of *Bread*:

12···7···15 — 12 — (9 — 84 (5$\frac{7}{15}$ Ounces of *Cheeſe*.

12···3···15 — 12 — (6 — 36 (2$\frac{4}{15}$ Ounces of *Butter*.

Examples in the Double Rule.

If four *Souldiers* can make up 12 Rood of a *Trench* in 24 Hours, how many Roods can 32 *Souldiers* make up in 72 Hours?

Souldiers.Rood.Souldiers. 4——12——32 — 12 — 64 — 384 (Rood. — 44 (96

Hours.Rood.Hours. 24——96——72 — 72 — 192 — 32 — 672 — 384 — 6912 — 24 — Rood. — 6912 (288

If 3 *Horſes* coſt in keeping 6 Days 16 *s.* what will coſt the keeping of 24 *Horſes* 48 Days?

3——16——24 — 16 — 144 — 384 (128 *s.* 24 — 333 — 384

6——128——48 — 48 — 1024 — 512 — 6144 (102 — 6666 (51 *l.* — *ſhill.* 4 (4 *ſhill.*

If 2 *Souldiers* have 4 for Months Entertainment 9 *l.* 12 *s.* what ſhall 756 *Souldiers* have in 12 Months?

2——9——12——756 — 20 — 192 — 192 — 1512 — 6804 — 756 — 145152 (7257 (6 — 22222 — 3628——16

Of the SQUARE ROOT.

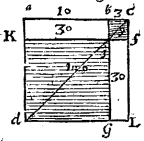
EVery Number being multiplyed by it ſelf of what value ſoever, gives a Square Number, and the Number whereof the Square is produced by the *Multiplication* of it in it ſelf, is called the *Side*, or *Root* of the *Square*.

Therefore to find the *Quadrate*, or *Square Root*, or ſide of any Number which Multiplyed in it ſelf maketh the Number propoſed. You are to take Notice that all Squares under 100 are found by the following *Table*, or by Multiplying any of the nine Simple Numbers in themſelves; but the ſides of greater Squares are to be found out only by Art.

The Table.

1	2	3	4	5	6	7	8	9
1	4	9	16	25	36	49	64	81

This Artificial Device is taken from the 4 *Propoſitions of Euclid*, where by Demonſtration it is proved, that if a right *Line* be cut into any 2 *Parts*, or *Segments*, the Square of the whole *Line* is equal to the Squares of the *Segments*, and to the 2 right angled *Figures* made of the *Segments*; as in the Figure, the 2 Diagonals *K,G*, and *b, f*, are the Squares of the *Segments a, b*, and *b, c*, alſo the Complements *B, K*, and *f, G*, are the right angled Figures, made by Multiplying the *Line a, b*, by *b, C*.



The ſame parts are to be found in any Square Number; as for Example, let the Number be 169, whoſe ſide is 13, the ſide divided into 2 parts, *viz.* 10 and 3, multiplying each part by it ſelf one, *viz.* 10 by 10, and 3 by 3, then multiply one by the other, as 10 by 3, and 3 by 10, ſo you ſhall have 4 plain Numbers, whereof 2 are Squares. Therefore as the Square 169 is made by adding theſe four Numbers together, ſo by ſubducting of them ſeverally it is reſolved. To which Firſt Mark each odd, or third place with Points, becauſe the particular Squares are to be found in the odd places, and how many Points there be of ſo many *Figures* the *Root* is to conſiſt of. Then for ſo much as the *Unity* ſtanding under the firſt Point next the *Left Hand* is both a Square, and the ſide of a Square, that *Figure* 1 therefore being ſet in the *Quotient* alone, and Subducted from the *Unity*, ſtanding under the Point, nothing remains.

169 (1
1
0

This

This *Unity* set alone by it self in the *Quotient* doth signify 10, when another *Figure* is set by it, representing the side of the other lesser Square, as this doth the side of the greater. Wherefore the greater *Diagonal K, G*, is now Subducted from the whole Square, and the side thereof, if *K,c*, or *a,b*, they being equal to one another, and also the side of one of the Complements is found out: and this is the first Step. Moreover double the *Figure* in the *Quotient*, because being doubled it is the side of both the Complements taken together, viz. *K*, 1, and *G*, 1; then setting 2, . . the double Number, under 6, divide 6 (each in this place is as much as 60, and represents both the Complements)—— by 2, the *Quotient* is 3 representing the other side Remainig of the Complements, viz. *j, f*, or *h, C*, which Number place in the *Quotient*, and reckon it for the *Segment* remaining of the right *Line* given. Wherefore because 3 is the side of the Remaing *Diagonal*, that is to say, of the lesser Square *h, f*, therefore being set by the *Divisor* on the *Right-Hand*, and Multiplyed by it self, and also by the *Divisor*, it brings forth 3 plain Numbers, viz. the Square *h,f*, and the 2 Complements *a, j*, and *a, L*, which being subducted from the Numbers standing over them, nothing Remains; and so in any other Example: As in this, 625 the *Root* is found to be 25; but if this 625 had been 655, which is a greater Number than 625 by 30 *Unites*, the Integers of the Square *Root* had been still 25, only there had been left 30 which had been the *Numerator* of a Fraction, whose *Denominator* must ever be the double of the *Root* augmented by an *Unite*, and the Operation had been 25 $\frac{30}{51}$.

169 (13
1
——
023
3
——
69
——
00

To prove if you have extracted right, multiply the *Root* in it self, if there remains any thing, add it to the Product, which if rightly performed will give the Square Number.

Some Examples.

1. A *Colonel* having 1849 Men, he would set them in a square *Battalion*, how may *Souldiers* must there be in *Rank* and *File*?

18.49 (43 in Rank and File.
16

——

Proof.

249 — 43
83 — 43
3 — 43

249 — 129
— — 172
000 — 1849

2. There is one equal sided Square piece of Ground the content of which is 6098 Square *Rods*; to know if the length of one of the sides answer 78 *Rods*.

3. A *Colonel* having by him 2048 Men, he would place them in a *Battalion*, which shall be twice so long as broad, how many *Souldiers* must there be in length and breadth?

To resolve any Question of this nature, divide the Number of *Men* by the Number of the proportion of the *Battalion*, then extract the *Root* out of the *Quotient*, which is the *Souldiers* in breadth, which Multiplyed by 2 the Proportion gives the *Souldiers* in depth, or length.

2048 (1029 (32 in Breadth — 32
2222 — 2

And so of any other Proportion. 64 in length.

4. A *General* having an Army of 33756 *Souldiers*, would have them set in form of *Battle* 3 times so long as broad; how many Men must there be in breadth and length?

33756 (11252 (106 *Souldiers* in Breadth.
(16
106
3
318

To find how much of the Remainder of the Extraction is in *Souldiers*, multiply the Remainder by the Proportion (3); the aforesaid Example being in a Triple Proportion, and therefore it is divided by 3, and to bring it to the first again multiply by 3.

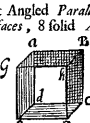
16 *Remainder* in the Extraction.
3 *Divisor*.

48 *Souldiers* remains of the whole Body.

For *Measuring* of *Land* it is not material to come so precisely to the knowledge of the Remainder of the Extraction, unless it be *Acres*, *Perches*, or any great Measure, which you may reduce to *Inches*, and then draw forth the Extraction, and quit the Remainder.

Of the CUBE ROOT.

A *Cube* in *Geometry* is a right Angled *Parallellipipedon*, having 6 equal *Surfaces*, 8 solid *Angles*, and 12 sides, as in the Figure *a,B,C,D,E, f, G,b*, whose sides are *a, b*, or *a, d*, also *B, C*, or *C, d*, either *C, E*, or *E, f*, also *E, h*, or *h,G*, likewise *G, f*, or *d, f*, or *d, a*, and *G, a*.



A *Cube* in *Arithmetick* is a Number made by three equal sides, or of two Multiplications by three Numbers, that is, of any Number Multiplyed in it self; and that Product again by the first Number, expressing Length, Breadth and Thickness.

The Number whereof the *Cube* is produced by the *Multiplication* of it in it self is called the side, or *Root* of the *Cube*, which being found out in whole Numbers, the *Cube* in known.

As for the *Cubes* under a 1000, whose *Roots* are simple Numbers, they are found by the following *Table*.

1	2	3	4	5	6	7	8	9
1	4	9	16	25	36	49	64	81
1	8	27	64	125	216	343	512	729

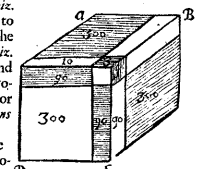
But

But in searching out the sides of greater *Cubes*, proceed as the following *Theorem* directs.

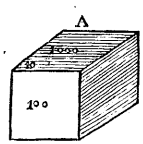
This Artificial Device is taken out of the *Theorem*.

If a right *Line* be cut into two *Segments*, the *Cube* of the whole *Line* shall be equal to the *Cubes* of the *Segments*; and to the two Solid Figures comprehended three times under the Square of his *Segment*, and the *Segment* remaining.

As the *Line E, j*, which is 13, is cut into two *Segments* 10 and 3; therefore the *Cube* of the whole *Line*, *viz.* 2197, is equal to the *Cubes* of the *Segments*, *viz.* 1000 and 27, and also to the Two-fold solids, or *Parallellipepidons* thrice taken; wherefore three have the like Solidity. The Solidity of each of the three lesser is 90, being made of the Square of the *Segment* 3, that is, of 9 Multiplyed by the other *Segment* 10, these three *Parallellipipedons* taken together make 270; but of the three greater *Parallellipipedons* each containeth 300, made of 100, the Square of the greater *Segment*, 10 Multiplyed by the lesser *Segment* 3, and they taken joyntly together make 900.

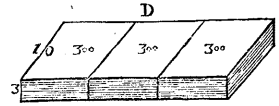


The *Cube* of the greater *Segment*.

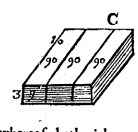


The *Cube* of the lesser *Segment*.

The three greater *Parallellipipedons*.



The three lesser.



The *Cube* whereof hath eight particular Solids in Number, which are made of the Parts of the Number given, *viz.* of 10 and 3 in this manner.

10——3
10——3

First let there be four plain Numbers made, each part being Multiplyed by it self, and one by another.	100	9 30 30 100
If again you Multiply the plains by the same parts, there will arise eight Solids, as you here see.	9 30 30 100	9 30 30 100
All which being added together, are equal to the *Cube* of the whole.	3	10
Therefore the same way that is used in making the *Cube*, is to be followed in resolving the *Cube*: As for Example.	27 90 90 300	90 300 300 1000

Mark the *Cube* given with points, omitting each two Figures continually, beginning at the right Hand, as 21 97; then subduct the particular *Cube* of the Number set underneath the last point, but that Number being no *Cube*, take the neareſt to it, *viz.* an Unite, which set in the *Quotient*, the Unite in the Number given is 1000, but in the *Quotient* it is but 10, the Unite subducted from 2, the remainder is 1; which must be writ over the Number given, so that the greater *Cube A*, is supposed to be subducted from the Number given; this is the first step.

1
2 197 (1
1

Triple the Quotient found out (that is, Multiply it by 3) this Triple represents the 3 sides taken together of the 3 lesser Solids marked *C*. then place the Triple Number under 9. again Multiply the *Quotient* Squarewise, and Triple the Product which likewise makes 3. this Product represents the 3 square sides of the 3 greater Solids, taken together marked *D*. then place the Product 1 Degree lower towards the left Hand underneath, with it divide 2 which is writ above it, the *Quotient* is 3, this *Segment* or *Quotient* 3, being Multiplyed by 3, the *Devisor* makes 9, which in respect of the place where it stands is 900, and represents the 3 greater Solids marked *D*, taken together.

Moreover the same *Quotient* being Multiplied Squarewise maketh 9, and Multiplied afterwards by the Tripled Number, standing under 9, makes 27, which in respect of the place it is in is 270, and represents the 3 lesser Solids marked *C*. Last of all the same *Quotient* Multiplied *Cubically*, brings the lesser *Cube B*, 27. These three *Products* therefore being added together. and the Total Subducted from the Number standing over it, there remains nothing which imports but the given Number is a *Cube*; As in the Example.

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1
2197 (13
1
3
——— Or thus,
9
27
27
———
2197

2197 (13 the greater Cube.
1000
3
3
——————— Solids
900 the 3 greater.
270 the 3 leſſer.
27 the leſſer *Cube*.
———
2197

The uſe of this will appear in caſting up the Solidity of the Ground of a *Fort*, which is here inſerted only to ſhew the Sections of a Solid Body.

10

GEO-

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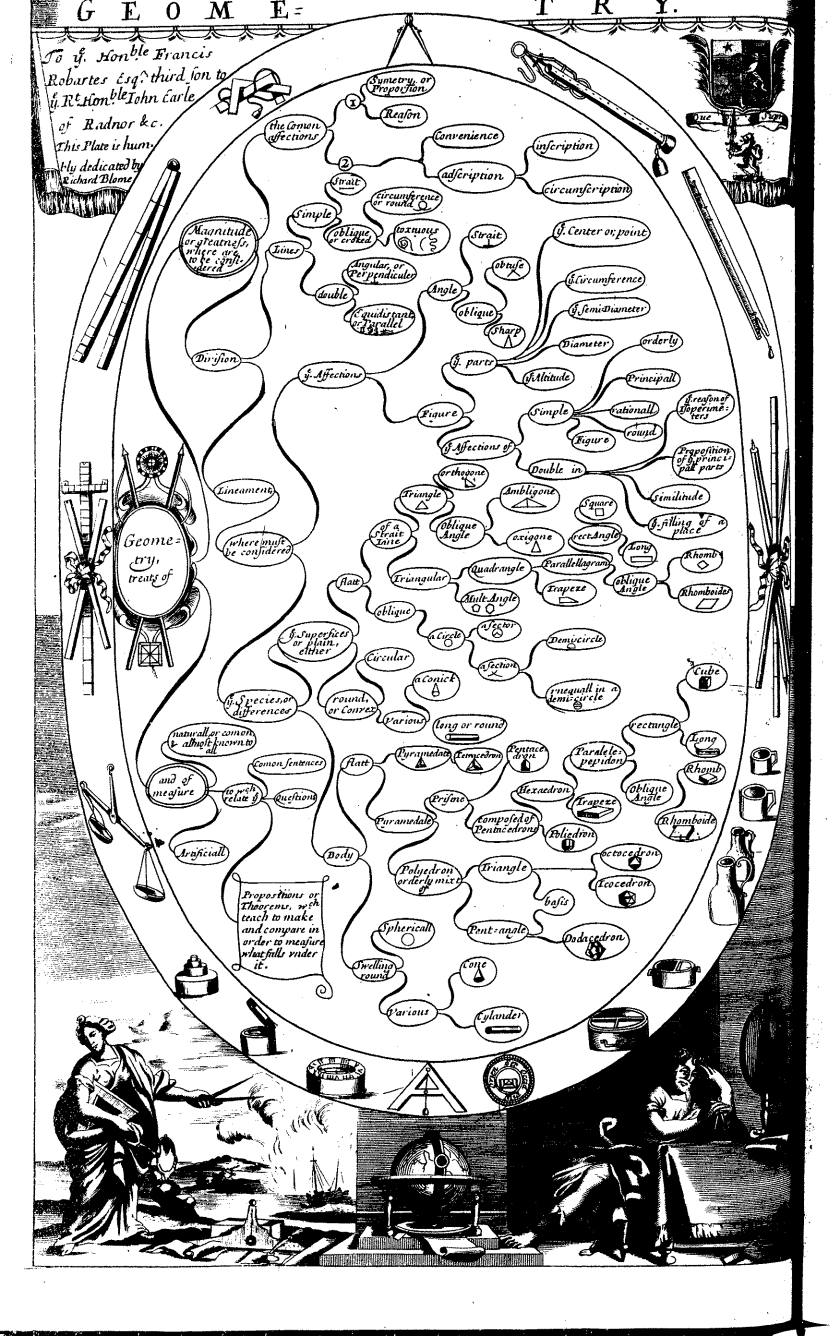

GEOMETRY.

GEometry is an Art of well Measuring any Magnitude or Bigness, that is to say, any continued *Quantity*, by which a thing is called Great, or Small.

The continued *Quantity* is that in which the parts are continued to a common *Term*.

A *Term* is the utmost part or point of *Magnitude*.

A Point is an indivisible Sign, or Mark in *Magnitude*; where first are to be considered the common *Affections*, and then the *Division*, or *Difference*.

The common *Affections* taken from Number are the Proportion and *Ratio*: those taken from themselves are the Convenients, and Adscription, in which are to be considered the *Inscription*, and the Circumscription.

Proportionable Magnitudes are those which are measured by the same Measure; those that are not Proportionable are Measured a contrary way.

Rational Magnitudes are those by which the *Ratio* is easily explicated by the. Number of the *Measure* proposed; the Irrational on the contrary.

The Congruous are those from which parts applied to parts take equal place. *Adjunct Magnitudes* amongst them are when the *Terms* of one are terminated by the *Terms* of another. That within is called the Inscribed, that without the Circumscribed. The *Division* or Difference of *Magnitude* is in a *Line* or *Lineament*. A *Line* is only a long Greatness, whose Termination is in a Point: In this must be considered the *Affections* of one alone, or of two; The *Line* alone is streight or crooked.

A *Streight Line* is that which extends it self equally within its *Terms*: On the contrary the crooked *Line* extends it self unequally within its *Terms*.

A *Crooked*, or an *oblique Line* is divided into a round or wreathed Circumference. A round Circumference is that which is equally distant from the middle of the space comprehended and encloséd; The wreathed on the contrary is that which is equally distant from the middle of the space any way encloséd and comprehended, of which there are several Species.

A *double Line* is perpendicular, or Angular, Parallel, or Equidistant.

Streight Lines between themselves are those, one of which falling under the other extends it self equally; Oblique or crooked on the contrary.

Parallel or equal-distant *Lines*, are those that are equally distant throughout.

A *Superficies* is a *Magnitude* more than long, in which there ar to be considered the Affections and the Species.

The *Affections* of a *Superficies* are *Angle* and *Figure*.

An *Angle* is the Concourse of two *Lines* meeting together in the common Section of *Terms*, whose sides are the *Terms* comprehending the *Angle*; Of which are two Species, streight and oblique.

A *streight* or *right Angle* is that whose Sides are right among themselves; Oblique on the contrary which is Obtuse or Acute.

The *Obtuse Angle* is an Oblique Angle, more than a right *Angle*; The Acute *Angle* is less.

Figure is a Superficies terminated and bounded on every side, in which we are to consider its Parts and Affections.

The Parts are the *Center*, the *Circumference*, the *Semidiameter*, the *Diameter*, and the *Altitude*.

The *Center* is a Point in the middle of a Figure; The Circumference is the comprehension of the Figure.

The *Semidiameter* is a right Line drawn from the Center to the Circumference.

The *Diameter* is a right Line drawn through the *Center* of a *Figure* which is flat: And streight Line Figures are properly called *Diagonal*; and in Solids the *Axis*.

The *Altitude*, or heigth is a Perpendicular from the Sommet or top of the *Figure* to the *Basis*.

In every *Figure* the Affections are of a simple or double *Figure*; of a simple *Figure*, as Order, Primarineſs, and *Ratio*.

An Orderly *Figure* is a *Figure* of equal *Terms* and *Angles*: A primier *Figure* is that which doth not divide it self into other *Figures* more simple. A *Rational Figure* is that which is comprehended in heighth and depth rational amongst themselves.

The *Affections* of a double *Figure* are in the *Ratio* of *Isoperimetre*, or equally Circumference. *Figures*, and in proportion of the primary *Figures*, and in likeness, complement of place, and roundness.

For the *Isoperimetrical Figures* are those of equal Circumference, like *Figures*, as those that are of equal *Angles*, and proportioned to the *Basis* of equal *Angles*: *Figures* filling a place are those which being set in whatsoever manner about the same Point leave nothing void. A round *Figure* is that whose *Radious's* are equal and alike. These are the Affections of a *Superficies*. Now follow the Species and Differences, *viz.* the *Superficies* and the *Body*.

A *Superficies* is a Dimension only large, whose *Term* is a *Line*, and is either flat like a Plate, or swelling.

A flat *Superficies* is that which extends it self equally in its *Terms*, and is of streight, or crooked *Lines*.

The

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The *Superficies* of ſtreight *Lines* is flat, which is comprehended in ſtreight *Lines*, and divides it ſelf into a *Triangle*, or a *Triangular*.

A *Triangle* is that which is made of three ſtreight *Lines*; A *Triangle* is of a ſtreight *Angle*, or a crooked *Angle*,

A *Triangle* of a ſtreight *Angle* is called *Orthogon*, which hath a right *Angle* whoſe dimenſion is taken by the *Regler*, which is the moſt excellent *Inſtrument*, and moſt uſeful of all the *Geometrical Inſtruments*, and moſt Antient; It is vulgarly called the *Jacobs Staff*.

A *Triangle* of a crooked *Angle* is that which hath not a ſtreight *Angle*, and is called *Amblygon*, or *Oxygon*.

The *Amblygon* is that which hath an obtuſe *Angle*: *Oxygon* is that which hath all the *Angles* ſharp: A *Triangulat* is a flat Superficies of a ſtreight *Line* which is compoſed of *Triangles*, and is either *Quadrangle*, or *Multangle*.

A *Quadrangle* conſiſts of four ſtreight *Lines*, and is a *Parallellogram*, or *Trapezium*.

A *Parallellogram* is a *Quadrangle* equally diſtant of the ſides which are oppoſite; whoſe Species muſt be conſidered, for there is a *Parallellogram* of a ſtreight, and of a Crooked *Angle*,

A Right *Angle Parallellogram* hath all right *Angles*; and is either ſquare, or oblong.

A Square is a Right *Angle Parallellogram* of equal Sides; The oblong is of unequal Sides.

A *Parallellogram* of an *oblique* or *crooked Angle* is called a *Rhomb*, or *Rhomboides*.

A *Rhomb* is a *Parallellogram* of a crooked *Angle*, and of equal Sides.

A *Rhomboides* is of a *crooked Angle*, and of unequal Sides; Theſe are the Species of a *Parallellgram*.

A *Trapezium* is a *Quadrangle* of four Sides with is not a *Parallellogram*.

A *Multangle* is a *Triangulat* comprehended in more than four ſtreight *Lines*.

The flat *Superficies* of a crooked *Line* is called a *Circle*, which is a *Superficies* flat and round, whoſe Segment is the *Sector* and *Section*.

The *Segment* of a *Circle* is that which is comprehended Exteriorly in the Circumference, Interiorly in a ſtreight *Line*. A *Sector* is a piece of a *Circle* contained within one ſtreight double *Line*, making One *Angle* at the *Center*, which is called the *Angle* at the *Center*; as the Circumference is called the *Baſe* of the *Sector*.

A *Sector* is likewiſe a piece of a *Circle* which is contained within a ſtreight *Line*, called the *Baſe* of the *Section*, and is a *Demicircle* or unequal to a *Demicircle*.

A *Demicircle* is half of the Section of a *Circle*; An unequal to the *Demicircle* is not the half of the ſaid *Section*.

A *Gibous*, or ſwelling Superfice is that which extends it ſelf unequally within its *Terms*; and is Circular or Various.

The Circular or *Spherical Superficies* is the *Gibous Superficies*, which is equidiſtant from the *Center* of the contained Space.

The various Superficies is alſo *Gibous*, whoſe *Baſis* is the Circumference; The Side one ſtreight *Line* from the *Term* of the top to the *Term* of the *Baſis*; It is called *Conical*, or *Cylindrical*.

A *Conical*, or pointed Superficies, is that which riſeth equally in a Point from the Subject ſubſected Circumference towards the Top.

A *Cylindrical*, or long and round Superficies is drawn and riſes equally in a Point from the ſubject Circumference towards the heighth Circumference equal and equidiſtant.

So much for the Superficies and all its Parts and Species.

A *Geometrical Body* that hath thickneſs is a Dimenſion large and deep, whoſe *Term* is the Superficies, the *Axis* is the *Diameter* about which it turns; it is flat and *Gibous*.

A Flat *Body* is comprehended of flat *Superficies*, and it is a Pyramid, or *Pyramidate*.

A *Pyramid* is a flat *Body*, raiſed equally high from the *Baſis* of a Right *Line*, and hath but one Species ordained it, which is a *Tretradon*, *viz.* an orderly *Pyramid* comprehended in four *Triangles*.

A *Pyramidate* is alſo a flat *Body* which conſiſts in *Pyramids*, and is a *Priſme*, or mixt *Polyedron*.

A *Priſme* is a *Pyramidate Body*, whoſe two oppoſite Flats are equal, alike, and equidiſtant; the reſt *Parallellogram*; and hath two Species, *Pentadron*, or compoſed of *Pentadrons*.

A *Priſme* compounded of *Pentadrons* is a *Hexadron*, or a *Poludron*.

The *Hexadron* is *Parallellipipedon*, or *Trapezium*.

A *Parallellipepidon* is a *Hexadron*, whoſe oppoſite Flats are *Parallellogram*; and it is either right *Angle*, or *oblique Angle*.

The Right *Angle Parallellipipedon* is like a *Die*, which is a right *Angle*, *Iſocedron*, or oblong.

An *Oblique Angle* is like a *Rhomb*, or a *Rhomboides*.

The mixt *Polyedron* is a *Pyramidate* compoſed of *Pyramids* that aſſemble themſelves from the upper part to the *Center*, and raiſing themſelves from the *Baſis*, alone, and is of a *Triangular Baſis*, as the *Octodron*, which is comprehended in eight *Angles*; the *Iſocedron* conſiſting of twenty *Angles*, or of a *Quinquangular Baſis*, which is comprehended in twelve *Quinquangles*, and is called *Dodecadron*.

The Convex *Geometrical Body* is that which conſiſts of a Convex *Superficies*, and is called a *Sphere*, or *Globe*.

A divers *Body* is comprehended in a divers *Superfices*, and *Baſis*, and it is a *Cone*, or *Cylinder*.

A *Cone* or a round *Pyramid* is comprehended in a *Conick Superficies*, *Baſis*.

A *Cylinder* is contained in a long and round *Superficies*, and oppoſite to its *Baſis*.

Hitherto hath been treated of the Definitions and proprieties of *Magnitude*, and all their parts and Species: There remains only *Meaſure*, and to *Meaſure* the *Magnitude* is the part of *Geometry*. But there are two ſorts of *Meaſuring*, one which is natural and common, and known almoſt to all, by which we apply the Meaſure to the thing Meaſured: So we know that each

each [illegible] is of ſix *Foot*, or ſix *Ells*, which we have experimented, that the *Foot* or *Ell* is not found ſo often in it.

According to this, *Euclid* makes demonſtration from the fourth Propoſition of the firſt Book, when he puts one *Triangle* to another.

Moreover the common *Propoſitions*, and *Queſtions* relate to this natural *Meaſure*.

Common Sentences are clear, and manifeſt *Propoſitions* of themſelves, and therefore called by *Cicero* Natural Judgments; But for as much as *Euclid* ſets down but three Demands, all the *Theorems* and *Propoſitions* always which tend to inſtruct to *Meaſure*, and teach what is moſt eaſy to do, relate to the Demands; as may be underſtood by the Definition of the Queſtion; 'tis this that falls commonly under a natural *Meaſure*. But for as much as it would be a long and moſt difficult thing to Meaſure the Places and Sides of great *Figures* by this natural ſight, there is another way more ſhort found out to Meaſure the *Magnitudes*, and all their Parts and Spaces, which is called *Surveying*, which ſhall be treated of more at large apart by it ſelf.

I ſhall conclude this Tract of *Geometry* with ſome neceſſary *Problems*: And Firſt as to the *Practick Part* thereof.

To cut a Line into two equal Parts.

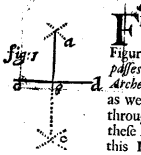


fig. 1

From the Extream Point of the given Line *c*, *d* Figure 1, opening your *Compaſſes* at pleaſure, deſcribe the *Arches* interſecting each other, as well above as beneath; and through the Interſections of theſe *Arches* draw a Line *a*, *b*, *c*; this Line will cut the given Line directly in the midſt, and by the ſame Method you may divide any *Angle* equally into two Parts: For Example, In the ſecond Figure from *a*, by whatſoever opening of the *Compaſſes* fix the *Points c*, and *b*, and from thoſe *Points* deſcribe the *Arches* interſecting each other in *e*, from that Interſection drawn the Line *e*, *a*, and it will cut the *Angle* in the midſt.

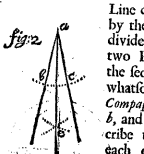


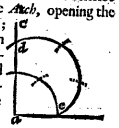
fig. 2

Any middle part being given in a Line, to raiſe from thence a Perpendicular.

From the Point, ſuppoſe *a*, in the firſt *Figure* at any convenient opening of the *Compaſſes*, you make *Points* on each ſide in the ſaid Line, as *c*, and *d*; then from thoſe Points at what opening of the *Compaſſes* you pleaſe, draw the *Arches* interſecting each other, as at *a*, and from their Interſection draw the Line *a*, *b*, to the given Point; ſo *a*, *b*, is the *Perpendicular*.

At the end of any Line to raiſe a Perpendicular.

From *a*, which is the given extream, deſcribe the *Arch e*, at any opening of the *Compaſs*; then from the Point *e*, at the ſame opening make a Point in the ſaid *Arch*; from the Point deſcribe another *Arch e*, *d*, and on the *Arch*, opening the *Compaſs* to thrice the interval; mark a third Point, from whence the deſired *Perpendicular c*, *a*, is to be drawn, and by this Method you may examine whether any *Line* be truly *Perpendicular*.



If a given Point, or diſtance be given to draw a Parallel.

Let the *Line a*, *b*, be given, and the diſtance be fixed at the Point *c*; from the ſaid *c*, draw at pleaſure the right *Line c*, *b*; then from the Point *c*, deſcribe the *Arch b*, *d*, In like, and at the ſame opening of the *Compaſs* from *b*, deſcribe the *Arch c*, *a*; take the diſtance *a*, *c*, and transfer it on the *Arch b*, *d*, which makes out the Point *d*, through which is drawn the *Parallel Line c*, *d*.

To divide a given Line into given Parts.

Take a *Line* at pleaſure; for Example, *g*, *e*, which muſt be bigger than the given *Line*. This *Line* divide by opening the *Compaſs* into as many equal Parts as are deſigned; as ſuppoſe from both Extremities of the *Line* ſo divided deſcribe the *Arches* interſecting each other in *v*, whence the *Æquilateral Triangle u*, *g*, *e*; is to be made; then from the Point *u*, draw *Lines* to the deſigned Sections in the lower *Line*; this done, if the *Line a*, *o*, be given to be divided into 5 Parts; mark out the length thereof in both ſides of this *Triangle*, by fixing the other Point of the *Compaſs* in the Point *u*; then make the ſaid *Line a*, *o*, between the Points thus marked, and thus the deſigned Diviſion will be finiſh'd; and in the the ſame manner may any other Diviſion whatſoever be made.

Two right Lines being given; to find a mean Line proportional.

Let 2 *Lines* be given, and both placed in a direct *Line*, one by the other, *viz.* *l*, *u*, and *u*, *r*, which are to make as it were one *Line* in all, out of the middle whereof *m*, make a *Semycircle l*, *t*, *r*; then erect the *Perpendicular u*, *t*, in

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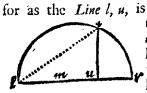
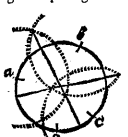
in the Point of the Conjunction of the *Lines*, *l*, *u*, and *u*, *r*. This *Perpendicular Line* touching the *Circle* will be the middle Proportional *Line* sought; for as the *Line l*, *u*, is to the *Line u*, *t*, so is the *Line u*, *t*, to the *Line u*, *r*, which in Numbers hath the same Proportion to the 2d, as the 2d hath to the 1st, as is demonstrated from *Euclid*.



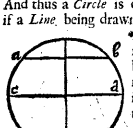
Three points being given, so as not placed in a direct Line, to describe a Circle, which shall strike through them all.

MAke the three Points *a*, *b*, *c*, described at pleasure, keeping the same opening *Arches* from the Points *a*, and *b*, cutting each other double in one of the opposite Parts; then altering the opening of the *Compasses*, as occasion requires, describe in like manner double in the other opposite Part *Arches* intersecting each other from the Points *b*, and *c*; then through the Sections of these *Arches* draw right *Lines*; the Point of Concourse will be the *Center* of the *Circle* drawn.



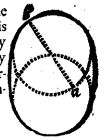
A Circle being given, to find the Center thereof.

DRaw from one part of the *Circle*, to the opposite Part; as suppose the *Line a*, *b*; this *Line* divide into 2 equal Parts, which will pass through the *Center* of the *Circle*; but if this *Line* be also divided by the *Line c*, *d*, into 2 equal Parts, they will intersect each other in the *Center*. And thus a *Circle* is divided into 4 equal Parts, if a *Line* being drawn through the *Center*, this *Line* will be also divided into 2 equal Parts, and by this, means also a Square may be inscribed in a *Circle*, if *Lines* be drawn through the extremities of those *Lines*; So likewise by dividing it into 6 Parts a *Hexagon* may be described, and proportionably an *Octagon*, and *Dodecagon*, &c. according as more are drawn, and more Divisions made.



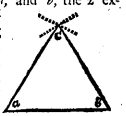
To make an Elipsis, or Oval Figure.

DEscribe two *Circles*, one through the *Center* of the other, fixing the *Foot* of the *Compass* at the same opening in its *Circumference*; then from *a*, or any other part of the *Circle* draw a *Line* through the *Center* to the *Circumference* in *b*, which *Line* is the extention of the *Compass*, by which the *Elipsis* is made, by placing one *Foot* in the intersections of the *Circles*, and joyning them by *Arches*.



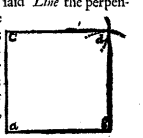
A right Line being given, to describe upon it an Equilateral Triangle.

THe *Compass* being opened to the length of the *Line a*, *b*, from *a*, and *b*, the 2 extreams of the said *Line*, describe the *Arches* intersecting each other in *c*; then from the Point of that Section draw the *Sides c*, *a*, and *c*, *b*, and thereby the said *Triangle* is compleated:



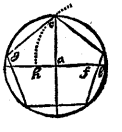
A right Line being given, to describe a Square upon it.

THe *Line a*, *b*, being given, erect upon *a*, the extremity of the said *Line* the perpendicular *a*, *c*, according to the length of the *Line a*, *b*; then from the Points *b* and *c*, describe the *Arches* intersecting each other in *d*; then draw 2 other *Lines* to the Point of that Section, and the work is perfected.



To describe a Pentagon, or to find the Sides of it in a given Circle.

A *Circle* being drawn, and divided into 4 equal Parts, divide the Semidiameter *a*, *b*, into 2 Parts in *f*; then from the Point *f*, extend the *Compass* to the *Point c*, and in that extention *f*, *c*, describe the *Arch c*, *h*; then again extend the *Compass* from *c*, to the Point *b*, and this last extention will give the Side of the *Pentagon g*, or five-sided *Figure*. How to draw a sixth seventh or eighth to a twelfth-sided *Figure*, or a *Dodecagon*, which is taught in *Fortification*.



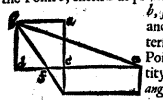
An Oblong being given, to constitute a Square equal to it.

IF a mean proportion be found between the 2 *Lines* containing the same *Angle* of the *Oblong*, that mean proportioanl will be the Side of the said Square.

A Square being given, to find an Oblong equal to it.

DIvide the Side *a*, *c*, and afterwards the Side *d*, *e*, into 3 equal Parts; then by a third Part

Part to *a*, and likewise by a third Part to *f*; from the Point *b*, extend at pleasure the *Lines b*, *c*, and *b*, *f*, and the Sides *a*, *c*, *f*, and *d*, *c*, *e*; so by the Intersections made in the Points *c*, and *f*, the quantity of the sought *Rectangle* is resolved.

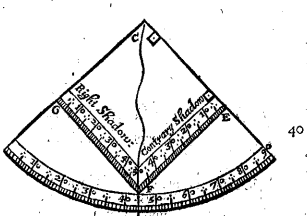


A Circle being given, to make a Triangle equal to it.

LEt a *Perpendicular* be erected, or the extream Point of the *Semidiameter* of a *Circle*, and let the length of the *Perpendicular* be equal to the *Perimeter*, or *Circumference* of the *Circle*; then from the *Center* draw a *Line* to the extremity of the *Perpendicular*, and this will produce a *Triangle* equal to a *Circle*.

ALTIMETRY.

ALtimery or the *Art* of taking *Altitudes*, or the Heighth of the *Sun Moon*, or *Stars*; also of *Hills*, *Trees*, *Steeples*, &c. is performed by several Instruments, but chiefly by the *Quadrant*; the *Figure* of which is here described.



The *Quadrant* may be made of any bigness, the larger the more exact.

The *Arch* of the *Quadrant* is divided into 90 *Degrees*, *viz.* the fourth part of a *Circle*; and these *Degrees* into *Parts*, or *Minutes*, if so possible, numbred from 10 to 90 Degrees. In this *Quadrant* is inscribed the *Quadrant C*, *E*, *F*, *G*, whose Sides *G*, *F*, and *F*, *E*, are divided into 50 equal Parts; On the Side *C*, *F*, are the Parts of the right *Shadow*; on the other Side *F*, *E*, are the Parts of the contrary *Shadow*. In the *Center* at *C*, there is a Thread fixed with a *Plummet* hanging at it; and on the Sides *C*, *E*, there are placed 2 Sights.

The use of the Quadrant.

THe use of the *Quadrant* is for the finding the *Altitude* of the *Sun*, *Moon*, or *Stars*, which is as follows; First in observing the *Altitude* of the *Sun*, hold up the *Quadrant*, the *String* and *Plummet* hanging at the *Center C*; then turn the *Sights* to the *Sun* till the Shade of the *Sight* next the *Center C*, strikes on the other *Sight* at *E*, and until the *Sun* Shine through both the *Sights*. Mark what Degree the *Thread* cuts on the *Arch* of the *Quadrant*, and that is the *Suns Altitude*, reckoned from 10 to 20.

In observing the *Altitude* of the *Moon*, or *Stars*, hold up the *Quadrant*, and look through both *Sights*, until you see the *Moon*, or *Star* you observe, and the Degree the *Thread* cuts is the *Altitude* observed.

The best and surest way in taking the Heighth of any *Land-Object*, is by the *Rule* of *Proportion*, because then any *Station* will do the work. But Heights may be taken without it, provided the Ground admit. Mark the place whose Heighth you would know, and look through the *Sights* to the place, going backwards and forwards until the *Thread* and *Plummet* hanging at *C*, fall on 45 *Degrees* of the *Quadrant*, or else upon one half of the Parts of the right and contrary *Shadow*; then conclude the Heighth to be equal to the Distance. If it fall upon one half of the Parts of the right *Shadow*, then is the Heighth but half the Distance; if upon one *Quarter*, then the Heighth is but a *Quarter* of the Distance; and if it fall on three *Quarters*, then is the Heighth three *Quarters* of the Distance.

Now of the Parts of *Contrary Shadow*; if the *Thread* fall upon half the parts, then is the Heighth double to the Distance, if it fall half way, then this and the *Line* whereon the *Sights* are placed, is the Heighth 4 times the Distance.

To perform this by *Arithmetical operation*; take any *Station*, and look through or by the edge of the *Sights*, to the top of any *Tree* or *Steeple*; then mark whether the *Thread* fall upon the Parts of right or contrary *Shadow*; if on right *Shadow*, then the proportion is as the whole parts, *viz.* 50 are to the parts cut, so is the distance to the Heighth; And on the contrary, if the *Thread* and *Plummet* fall on the contrary *Shadow*, then say, as the parts cut are to the whole *Scale*, or 50, so is the distance to the Heighth: observing this for a general *Rule*, It is easy to find any Heighth that is accessable.

To find the Heighth of any Steeple that you cannot approach to Measure, the distance, because of Water, or other Obstructions.

THis is done by two *Observations*; First stand, and observe the Heighth, and you'l find the *Thread* fall on 35 Parts of right *Shadow*; and because you cannot measure to the *Steeple*, suppose the distance 90 *Yards*; then say, as 50 the whole Parts of right *Shadow* is to 35 Parts cut by the *Thread*; so is 40 *Yards* the supposed distance to 28 the supposed Heighth.

Then going a little farther in a *Streight Line* from the *Steeple* observed, you'l find the *Thread* to fall upon 33 Parts of *right Shadow*; then say as 33 Parts cut by the *Thread* is to the whole

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whole *Scale* 50, ſo is 28, the ſuppoſed Heighth to 42 *Tards* 1 *Foot*, 3 *Inches*, the ſuppoſed diſtance of the *Second* Station, *viz.* 2 *Tards*, 1 *Foot*, 3 *Inches*.

But in meaſuring the *Sationary Diſtance*, you'l find it to be only 2 *Tards*, 3 *Inches*; then ſay as 2 *Tards* 1 *Foot* 3 *Inches* the ſuppoſed diſtance is to 2 *Tards* 3 *Inches* the true one, ſo is 28 *Tards* the ſuppoſed Heighth to 44 *Tards*, 4 *Inches* the true one. Then you may by this find the true diſtance to the Foot of the *Steeple*, by ſaying, as 28 *Tards*, the ſuppoſed Heighth is to 24 *Tards* 4 *Inches* the true one, ſo is 42 *Tards*, 1 *Foot*, 3 *Inches* the ſuppoſed diſtance from the ſecond Station, to 36 *Tards*, 1 *Foot* 7 *Inches* the true diſtance from the ſecond Station to the Foot of the *Steeple*; and for the diſtance of the firſt *Station* taken away, the difference of the two Stations 2 *Tards*, 3 *Inches*, and the remainder will be the diſtance of the firſt Station to the *Steeple*.

If the *Thread* fall upon the Parts of contrary *Shadow*, obſerve only the Rules before laid down.

Note, when you are to find a diſtance, the Heighth given, or ſuppoſed, you are to uſe the proportion of contrary *Shadow* in right, and right in contrary; as in the laſt example in right *Shadow*, that is, as the parts cut is to the whole *Scale*, which is the proportion of contrary *Shadow*, and in contrary *Shadow* as the whole *Scale* is to the parts cut.

Note alſo, that in taking the *Heights* you are to add always the Heighth of your *Eye* from the Ground.

PLANIMETRY, OR SURVEYING.

CHAP. I.

Of the ordinary Scale, with the Line of Cords thereon deſcribed.

AMongſt the many *Inſtruments* that have been invented for the *Surveying* of *Land*, none is in more eſteem than the *plain Table*, as it is at this Day improved, it being the moſt abſolute of all others for the ſaid purpoſe, in that it performs whatſoever may be done either by the *Theodolite*, *Circumferentor*, or any other *Inſtrument*, and that with the ſame eaſe and exactneſs.

For a particular Deſcription of it I refer you to the fourth Chapter of the Second Book of *Leyborns compleat Surveyor*.

The *Chain* that is made uſe of in this Treatiſe is *Bathburns* of two *Statute Poles* or *Perches*, each *Pole* being in length 16 ½ *Foot*, or 198 *Inches*, which is divided into 10 equal Parts, called *Primes*, containing 19 ⅘ *Inches*; and theſe *Primes* ſubdivided into 10 other equal Parts, called Seconds.

In the eighth Chap. of *Leyborns* Second Book you have the Deſcription of the *Protractor*, and the ninth the Deſcription of ſeveral *Scales*, very uſeful for the ready laying down of *Lines* and *Angles*, according to any aſſigned quantity, all which *Inſtruments* may be had at any *Inſtrument-makers*.

The Principles of *Geometry* neceſſary to the practice of *Surveying* being handled in the Treatiſe of *Partical Geometry*, are omitted here; ſo that I ſhall proceed to the Art it ſelf.

For this purpoſe be provided with a *Ruler* containing in length 7 or 8 *Inches*, and in breadth 1 ½ *Inch*, upon which (on the one ſide) place 2 *Scales*, one of 11, the other of 12 in an *Inch*. Alſo on the ſame Side Deſcribe a *Line* of *Cords*, 2 *Inches* in length, or leſs, of 60, or 90 *Degrees*, whoſe *Radius*, or 60 *Degrees* thereof will be equal to the *Semidiameter* of the ſame *Circle*.

On the other ſide after the order of theſe, place divers other *Scales*, as of, 16, 20, 24, &c. in an *Inch*, ſo that you have an *Inſtrument* uſeful for divers occaſions. To uſe with this *Scale* you muſt have a Pair of *Braſs Compaſſes* with ſteel Points, as alſo a neat Pair of *Callem Compaſſes*, with *Screws* to alter the Points, as to draw with *Black Lead*, or the like, which will be uſeful for the beautifying your Plats after protracted.

CHAP. II.

How to reduce Statute Meaſure to that which is Cuſtomary.

BY the *Statute* of 33 *Edw.* 1. an Acre of Ground is to contain 160 Square *Perches*; but in many parts of this Kingdom, through long Cuſtom, other quantities have been received, called Cuſtomary, *viz.* 18, 20, 24, and 28 *Foot* to the *Perch*; ſo that the *Surveyor* ſhould be well experienced to reduce one to the other. For Example of which.

To reduce 5 *Acres*, 2 *Rods*, 20 *Perches* meaſured by the 18 *Foot Pole* into *Statute Meaſure*, ſeek out the leaſt proportional Terms between 18 *Foot* and 16 ½ *Foot*; to effect which do thus: Becauſe 16 ½ beareth a *Fraction* reduce it into Halves, and to make them of one denomination alſo, reduce 18 into Halves, and they will ſtand thus $\frac{1}{18}$ which abbreviated by 3, by ſaying How many times 3 in 33; the Anſwer is 11: The like do by 36, which will be 12; ſo will the two proportional Terms between 16 ½ and 18, be 11 and 12.

This done, reduce your given quantity 5 *Acres*, 2 *Rods* and 20 *Perches*, into *Perches*, which makes 900 *Perches*: and conſidering that what proportion the Square of 11, which is 121, bears to the Square 12, which is 144, the ſame proportion doth the *Acre* of 16 ½ *Foot Pole*, bear to an *Acre* of 18 *Foot*.

Now for that the greater Meaſure is to be reduced into the leſſer, multiply the given Quantity 900 *Perches*, by 144, the greater Square, and the *product* will be 129600, which divided by 121, the *Quotient* will be 1071 $\frac{9}{121}$ *Perches*, which being reduced into *Acres* giveth 6 *Acres*, 2 *Rods*, 31 *Perches*, and $\frac{9}{121}$ parts of a *Perch* for the quantity of *Acres* according to *Statute Meaſure*.

But contrary-wiſe ſuppoſe it had been required to reduce *Statute Meaſure* into *Cuſtomary*, then you ſhould have multiplied 900 *Perches* (your given Quantity) by 121, your leſſer Square, (becauſe the leſſer Meaſure is to be reduced into the greater) the Product will be 108900, which being divided by the greater Square 144, the *Quotient* will be 756 ¼, which reduced into *Acres*, is 4 *Acres*, 2 *Rods*, 36 ¼ *Perches*.

The ſame Method is to be obſerved with any other Cuſtomary Quantity, as when you meaſure with the *Perch* of 20, 24, or 28 *Foot*.

CHAP. III.

To reduce Perches into Acres, and the contrary.

BY the *Statute* of 33 *Edw.* 1. as aforeſaid, an Acre of Ground is to contain 169 ſquare *Perches*, and is every *Rod* of Land 40 Square *Perches*: Therefore if any Number of *Perches* be required to be put into *Acres*, the Number given is to be divided by 160, and the *Quotient* ſhews the *Acres*; But if any thing remain (if under 40) they are *Perches*; and if they exceed 40, divide it by 40, which are the Number of *Perches* contained in a *Rod*, and the *Quotient* are *Rods*, and the Remainder *Perches*.

For Example, 5267 *Perches* being given to be reduced into *Acres*: Firſt divide the 5267 by 160, and the *Quotient* will be 32, and 147 remains, which divide by 40, and the *Quotient* will be 3, and 27 remaining, ſo that the whole amounts to 32 *Acres*, 3 *Rods* and 27 *Perches*.

To reduce Acres into Perches.

THis is but the converſe of the former, for whereas before to bring *Perches* into *Acres* you divided by 160, you muſt now to turn *Acres* into *Perches*, multiply by 160.

For Example; Let 32 *Acres*, 3 *Rods* and 27 *Perches* be given to be reduced into *Perches*; Firſt multiply the 32 *Acres* by 160; and the Product will be 5120; then multiply the 3 *Rods* by 40, the Product will be 120; theſe 2 Products, and the 27 *Perches* being added together, the *Sum* will be 5267, and ſo many *Perches* are contained in the foreſaid Number of *Acres*, *Rods* and *Perches*.

CHAP. IV.

Sheweth how to multiply the ſeveral Fractions of your Chain together, as if they were whole Numbers.

SUppoſe you were to multiply 16 *Unites*, 2 *Primes*, by 1 *Unite*, 3 *Primes*, 2 *Seconds*. Place your Numbers in all reſpects as if whole Numbers, but over every *Fraction* of your *Multiplicand* place a Prick, or *Point*, as in this Example: The *Multiplicand* contains only one *Fraction*, which is 2, over which place a Prick, and at the end of your *Multiplier* place as many Pricks as there are *Fractions* contained in that Number, which in this Example are 2, *viz.* 3, and 2; behind which Figures place 2 Pricks, and the Number will ſtand thus; Under which draw a *Line*, and Multiply theſe two Numbers together in all reſpects as if they were whole Numbers, and then the Work will ſtand thus, your *Product* of your *Multiplication* being 21384. Now becauſe in your two Numbers, *viz.* your *Multiplicand*, and your *Multiplier* there are 3 Fractions, *viz.* one in your *Multiplicand*, and 2 in your *Multiplier*, you muſt therefore with a *Daſh* of your *Pen* cut off the 3 laſt *Figures* of your *Product* towards your Right Hand, and then will your *Product*

16 2	
2 3	
162	
132	
324	
486	
21384	

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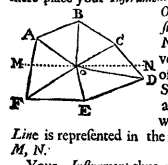
ſtand thus: 21 384. The 3 laſt *Figures* whereof are the *Numerator* of a *Fraction*, whoſe *Denominator* is 1000, and the other 2 *Figures* towards your Left Hand are *Integers* of your *Multiplication*; ſo that the Sum of this *Multiplication* is 21 *Perches* $\frac{384}{1000}$ parts of a *Perch*, which is ſomething more than a third part of a *Perch*.

CHAP. V.

Sheweth how to take the Plot of a Field (upon your plain Table) at one Station, taken in any part of the ſame Field, from whence all the Angles of the Field may be perceived.

FOr effecting this, go round the *Field*, placing at every *Angle* Marks, then chuſe ſome convenient place, about the middle thereof, from whence you may ſee all the ſaid Marks, and there place your *Inſtrument*, with a Sheet of *Paper*; ſtretch thereon the *Needle*, hanging directly over the *Meridian Line* in your *Card*, which is much to be obſerved, eſpecially when you Survey many Severals; then making a Mark about the middle of your *Paper*, which repreſents that part of the *Field* where your firſt *Inſtrument* ſtands, and laying your *Ruler* upon this Point, direct your Sights to the ſeveral *Angles* where you before placed your Marks, and draw *Lines* by the Side of your *Rules* upon your *Paper*; then meaſure the diſtance of every of theſe Marks from your *Inſtrument*, and by your *Scale* ſet the ſame diſtances upon the *Lines* drawn upon your *Table*, making ſmall Marks with the Points of your *Compaſſes*, or *Black-lead* at the end of every one of them; then *Lines* being drawn by theſe Points from one to another, you ſhall have upon your *Table* the exact *Plot* of the *Field*, with all its Sides and *Angles*.

Suppoſe you were to take the *Plot* of the *Field A, B, C, D, E, F.* having placed Marks in ſeveral *Angles* thereof, as at *A, B, C, D, E*, F, make choiſe of ſome convenient Place about the middle of the *Field*, where you may ſee all your Marks before placed in the ſeveral *Angles*, and there place your *Inſtrument*; which Place let it be



0; then turn your *Inſtrument* about until the *Needle* hang directly over the *Meridian Line* of the *Card* noted at the South end with a *Croſs*, and at the North end with a *Flower-delis*, which *Line* is repreſented in the following *Figure*, with *M, N.*

Your *Inſtrument* thus placed, with a Sheet of Paper thereupon, make a Mark with *Black-lead*, or otherwiſe upon the Paper, which Mark repreſents the place of your ſtanding; then applying your *Index* to this Point, direct your Sight to your firſt Mark at *A*, and the *Index* reſting there, draw a *Line* by the Side; then meaſure the diſtance from *0*, the place of your *Inſtrument*, to *A*, the Mark, which ſuppoſe to be 40 *Perches*; then take 40 *Perches* from one of your *Scales*, and apply that diſtance in your *Table* from *0*, to *A*, and at *A*, make a Mark; then direct your Sight to *B*, your ſecond Mark, and draw a *Line* by the ſide of your *Index*, as aforeſaid; then meaſure the diſtance from your *Inſtrument* at *0*, to your Mark *B*, which ſuppoſe 45 *Perches*. This diſtance muſt be taken from your *Scale*, and ſet upon your *Table* from *0* to *B*, and at *B*, make another Mark.

Then direct your Sight to a third Mark at *C*, and draw a *Line* by the Side of the *Index*, and meaſure the diſtance from *0*, to *C*, which ſuppoſe 42 *Perches*; this diſtance being taken from your *Scale*, and applyed to your *Table* from *0*, to *C*, ſhall give you the Point *C*, repreſenting your third Mark.

In this manner you muſt proceed with the reſt of the Marks at *D, E*, and *F*, or more, if the *Field* had conſiſted of more *Angles*.

Laſtly when (according to the former Directions) you have found all the Marks *A, B, C, D, E*, and F, upon your *Table*, draw *Lines* from one Mark to another, till you conclude where you began. For Example, ſuppoſe you began at *A*, and then to *B*, and *C*, ſo proceeding round about the *Field*, till you come to *A*, again; then draw a *Line* from *A*, your firſt Mark, to *B*, your ſecond Mark, and a *Line* from *B*, your ſecond Mark to *C*, your third Mark, and from *C*, your third Marck to *D*, your fourth Mark, and likewiſe from *D*, to *E*, from *E*, to F, and from *F* to *A*, where you firſt began; then will the *Lines AB, BC, CD, DE, EF*, and *FA*, be the exact *Figure* of the *Field*; the Sides and *Angles* of the ſaid *Figure* bearing an exact proportion to thoſe in the *Field*, and the Pricked *Lines, M, N* repreſent the *Meridian Line*.

Another Example to take the Plot of a Field by help of the Degrees on the frame of your Plain-Table, when either Rain, or Wind ſo obſtructs you that you cannot keep a Sheet of Paper upon your Table, and by meaſuring as aforeſaid.

HAving placed Marks at the ſeveral *Angles* of the *Field*, as before directed, and made choiſe of ſome convenient place about the middle thereof, as aforeſaid, place there your *Inſtrument* as already directed; then direct your Sights to your firſt Mark at *A*, noting the *Degrees* cut by the *Index* on the frame of the *Table*, which ſuppoſe 40 *Degrees*, 15 *Minutes*, which muſt be noted down in your *Field-Book* in the firſt and ſecond Colums thereof; then meaſure the diſtance from *0*, the place of the *Inſtrument*, to *A*, your firſt Mark, which ſuppoſe 40 *Perches*, which muſt

muſt be placed in the third Colum of your *Field-Book*. Then direct your Sight to *B*, your ſecond Mark, noting the *Degrees* cut by the *Index*, which ſuppoſe to be 88, and the diſtance *0, B*, 45 *Perches*; the 88 *Degrees* muſt be noted in the firſt Colum of your *Field-Book*, and the 45 *Perches* in the third *Colum*.

Then direct your Sight to *C*, the third Mark, and note the *Degrees* cut by the *Index*, which ſuppoſe 130 *Degrees* 45 *Minutes*, and let the diſtance *0, C*, be 42 *Perches*; the 130 *Degrees*, 45 *Minutes* muſt be noted in the firſt and ſecond Colums of your ſaid Book, and the 42 *Perches* in the third Colum.

Then direct your Sights to *D*, your fourth Mark, noting the *Degrees* out by the *Index* on the *Frame* of the *Table*, which let be 200 *Degrees*, 30 *Minutes*.

By the way note, that in the uſing the *Degrees* on the *Frame* of your *Table*, that having paſſed 180 *Degrees*, which is the *Line M, N*, repreſenting the *Meridian-Line*, you muſt then count the *Degrees* backward, according as they are numbred on the *Frame* of the *Table*, from 190 to 360.

Then Meaſure the diſtance *0, D*, which let be 60 *Perches* 4 *Primes*; theſe 200 *Degrees*, 30 *Minutes* muſt be noted in the firſt and ſecond Colums of your *Field-Book*, and 60 *Perches*, 4 *Primes* in the third and fourth Colums thereof.

Then direct your Sight to *E* your Fifth Mark, the *Index* cutting 250 *Degrees*, and the diſtance *0, E*, being 39 *Perches*; theſe muſt be noted in your ſaid Book, the 250 *Degrees* in the firſt Colum, and the 30 *Perches* in the third.

Laſtly direct your Sights to *F*, your laſt Mark, the *Index* cutting 310 *Degrees*, and the diſtance *0, F*, being 50 *Perches*; theſe muſt be noted down in your *Field-Book* in all reſpect as before, *viz.* the 310 *Degrees* in the firſt Colum, and the 50 *Perches* in the third, and then will your *Notes* collected in your *Field-Book* ſtand, as in the following *Table*.

	Deg.	Mi.	Pe.	Pri.
A	40	15	40	0
B	88		45	0
C	130	45	42	0
D	200	30	60	4
E	250		39	0
F	310		50	0

Further Directions how to Protract, or lay down upon Paper any Obſervations taken according to the Directions aforeſaid.

DRaw upon a Sheet of white *Paper* a *Line* at length, repreſenting the *Line M, N*, in the aforeſaid *Figure*; then make choiſe of ſome Point or other in that *Line* to repreſent your Station in the *Field*, upon which place the *Center* of your *Protractor*, ſo that the *Line N, S*, of your *Protractor* may lye directly upon the *Line M, N*; then laying your *Field-Book* before you, and ſeeing that at your firſt Obſervation noted with *A*, the *Index* cut 40 *Degrees*, 15 *Minutes*, you muſt therefore againſt the 40 *Degrees*, 15 *Minutes* of your *Protractor*, make a Mark upon your Paper, which muſt be repreſented by *A*.

Secondly, Seeing the *Degrees* cut at your ſecond Obſervation were 88, make a Mark upon your Paper againſt 88 *Degrees*, which Mark with *B*.

Thirdly, The *Degrees* cut at your third Obſervation were 130, and 45 *Minutes*, therefore againſt the ſame make a Mark upon your Paper, as *C*.

Fourthly, The *Degrees* cut by the *Index* at your fourth Obſervation, being 200 and 30 *Minutes*, you muſt againſt 120 *Degrees*, 30 *Minutes* of your *Protractor* make a Mark upon your Paper, as ſignified by *D*.

Fifthly, Seeing the *Degrees* cut at the fifth Obſervation were 250, make a Mark thereat, as *E*.

Laſtly, The *Degrees* cut at your laſt Obſervation were 310, therefore make a Mark thereat, as F.

Having thus *Protracted* all the *Degrees* of your ſeveral Obſervations, take away your *Protractor*, and laying a *Ruler* to the *Center O*, draw *Lines* by thoſe Points, which will be *0A, 0B, 0C, 0D, 0E*, and *0F*. This done, you muſt obſerve by your *Field-Book* the length of every *Line*.

As the *Line A, 0*, your firſt Obſervation was 40 *Perches*, therefore 40 being taken from your *Scale* and ſet upon your *Paper* from *0* to *A*, ſhall give you the Point *A*, upon your Paper.

Secondly, The length of your ſecond *Line* being 45 *Perches*, which take from your *Scale*, and place it on your Paper from *0*, to *B*.

Thirdly, The *Line 0, C*, being 42 *Perches*, which take from your *Scale*, and ſet upon your Paper from *0* to *C*.

And in this manner muſt you proceed with the reſt of the *Lines*, as *0 D, 0 E*, and *0 F*.

Laſtly, Draw the *Lines AB, BC, CD, DE, EF*, and F *A*, and ſo you ſhall have the exact Figure of your *Field* upon the Paper.

CHAP. VI.

Sheweth how to take the Plot of a Field upon your Plain Table at one Station, taken in any Angle of the ſame Field, from whence all the other Angles of the Field may be diſcerned, by meaſuring from the Stationary Angle to all the other Angles.

MAke choiſe of ſome *Angle* in the *Field*, from whence all the other *Angles* may be ſeen

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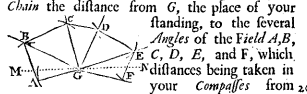
seen, and there place your *Instrument Horizontal*, the *Needle* directly over the *Meridian-line*, and a sheet of Paper stretched on your *Table*; then make choise of a Point on your Paper to represent your Station, which let be *G*; then direct your Sights to *A*, and draw a *Line* on your Paper as *G, A*, and measure the distance *G, A*, as is directed in the foregoing Chapter; then direct your Sights to *B*, your second Mark, and there likewise draw a *Line G, B*, measuring the distance *G, B*, as is directed in the said Chapter. In like manner direct your Sights to *C, D, E*, and F, drawing *Lines* by the side of your *Index* at every Observation, and measuring with your *Chain* the distance from *G*, the place of your standing, to the several *Angles* of the *Field A, B, C, D, E*, and F, which distances being taken in your *Compasses* from your *Scale*, and set upon your Paper from *G*, upon the *Lines G A, G B, G C, G D, G E*, and *G F*, so shall you have on your Paper the Marks *A, B, C, D, E*, and F, by which Marks draw *Lines*, as *G A, A B, B C, C D, D E*, EF, and F *G*, and so shall you have the true *Figure* of the *Field* described on your Paper,



To draw the Plot of a Field at one Station taken in any Angle of the said Field, and by measuring round about it without crossing it.

LEt the the *Figure A, B, C, D, E*, F, *G*, be the *Figure* of the *Field* to be measured. Then having placed Marks at the several *Angles*, and made choise of an *Angle* for your *Instrument*, suppose *G*, direct your Sights to *A*, and draw upon the *Table* the *Lines G, B*; then direct your Sights to *B*, and draw the *Line G, B*; then direct your Sights to *C*, draw the *Line G C*, and consequently the *Lines G D, G E*, and *G*, F.

Having thus done, measure with your *Chain* the distance from *G*, to *A*, which suppose 40 *Perches*, which take from your *Scale*, and 1 *Foot* of the *Compasses* placed in *G*, with the other draw the *Arch A*, and draw the *Line G, A*.

Secondly, Measure with your *Chain* the side *A, B*, which suppose 53 *Perches*; this being taken in your *Compasses* from your *Scale*, place 1 *Foot* in *A*, and with the other Foot draw the *Arch B*.

Thirdly, Measure the side *B, C*, which let be 59 *Perches*; and that being taken in your *Compasses* from your *Scale*, place one *Foot* in *B*, and with the other draw the *Arch, C*.

Fourthly, Measure the side *C, D*, 28 *Perches*, and take that distance in the *Compasses*, placing one *Foot* in *C*, and with the other drawing the *Arch D*.

Fifthly, Measure, the Side *D, E*, 54 *Perches*, and take that distance from your *Scale*, placing one *Foot* of the *Compasses* in *D*, and with the other draw the *Arch E*.

Sixthly, Measure the Side *E*, F, 49 *Perches*; and taking the distance from your *Scale*, place one *Foot* of your *Compasses* in *E*, and with the other draw the *Arch* F: And thus shall the several *Arches* cut the several *Lines G A, G B, G C, G D, G E*, and *G F*, in the Points *A, B, C, D, E*, F.

Lastly, By these Points draw *Lines* from one to the other, as *AB, BC, CD, DE, EF*, FG, and *GA*, and so shall you have upon your Paper on your *Table* the exact *Figure* of the *Field*, the Sides and *Angles* thereof being in all respects proportional to those taken according to the Doctrine of the last.

To take the Plot of a Field at one Station, taken in any Angle thereof, from whence all the other Angles may be seen, by help of the Degrees described on the Frame of the Plain-Table, and by measuring from your Station to every of the other Angles.

PLanting your *Instrument* at *G*, as aforesaid, direct your Sights to *B*, as your first Mark, (*for the Line G, A, lying under the Meridian Line M, N, must be measured in the last place*) noting the Degrees cut by the *Index* on the *Frame* of the *Table*, which suppose 47 Degrees, which must be noted in the first Colum of your *Field-Book*; then with your *Chain* measure the distance from your Station at *G*, to the *Angle B*, which let be 50 *Perches*, which place in the third Colum of your *Field-Book*, according to the former Directions.

2. Direct your Sights to *C*, noting the *Degrees* there cut, which suppose 88 *Degrees*, 15 *Minutes*, which place in the first and second Columns in your *Field-Book*; then measure the distance *G, C*, which let be 60 *Perches*, and note them in the third Colum of your *Field-Book*.

3. Direct your Sights to *D*, the *Degrees* cut being 120, and the distance *G, D*, 65 *Perches*; note these in your *Field-Book* as aforesaid. And in this manner proceed with the other Marks *E*, F, and *A*, and then having noted them all, your collected Notes in your *Field-Book* will be as follow.

	Degrees.	Minutes.	Perches.	Primes.
B	47	00	50	0
C	88	15	60	0
D	120	00	65	0
E	165	30	56	7
F	193	00	40	2
A	348	45	34	0

To protract any Observations taken according to the Doctrine aforesaid.

HAving collected into your *Field-Book* the quantity of the several *Angles*, and the Length of the *Lines*, proceed to Protraction in this manner.

1. Draw the *Meridian Line M, N*; then make choise of a Point therein, representing your Stationary *Angle*, as at *G*, to which Point apply the *Center* of your *Protractor* the *Semicircle* upwards; then laying your *Field-Book* before you, you may perceive that at your first Observation (which was at *B*) your *Index* cut 47 *Degrees*, and make a Mark against it, drawing a *Line G, B*.

2. The *Degrees* cut at your second Observation at *C*, being 88 *Degrees*, 15 *Minutes*, make a Mark likewise against 88 *Degrees*, 15 *Minutes* of your *Protractor*, and draw the *Line G, C*.

3. The Degrees cut at your third Observation being 120 Degrees of your *Protractor*, draw the *Line G, D*. And in this manner must you proceed with the rest of your Observations, *viz.* with the *Lines G E, GF*, and *G A*.

Having thus finished your *Angular Observations*, proceed to your lineal, to wit, the length of your *Lines* noted in the third and fourth Colums of your *Field-Book*.

And seeing that the Length of your first *Line G B*, was 50 *Perches*, take 50 from your *Scale*, and apply that distance to your Paper from *G*, to *B*.

2. The distance of your second *Line G C*, being 60 *Perches*, take 60 from your *Scale*, and apply the distance to your Paper from *G*, to *C*.

3. The distance of your third Mark *G D*, being 65 *Perches*, take that distance from your *Scale*, and apply it to your Paper from the Point *G*, to *D*.

In all respects as before proceed with the measuring of all the other *Lines* about the *Field*, were they never so many.

Lastly, If you draw the *Lines AB, BC, CD, DE, EF, F G*, and *G A*, you shall have upon your Paper the exact *Figure* of your *Field*.

And if you find these Operations not to agree, you had best examine, and reform the Error.

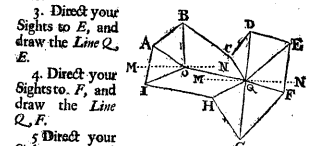
CHAP. VII.

How to take the Plot of a Field at two Stations, upon a Sheet of Paper stretched on your Table, and by measuring from the Stations to the visible Angles, the Field being so irregular that from no one place thereof all the Angles can be seen.

SUppose *A, B, C, D, E, F, G, H, I*, is the *Figure* of the *Field* to be drawn upon the *Plain-Table*, now because you cannot from any one place thereof see all the *Angles* at once, therefore make choise of two several Stations, which let be *O*, and *Q*. Then upon the Paper on your *Table* make a Mark, as *Q*, representing your first Station. This done, place your *Instrument* at *Q*, the *Needle* hanging directly over the *Meridian-Line* of your *Card*, as represented by the *Line M, Q, N*.

The *Instrument* being there fastned, direct your Sights to *C*, and draw upon your *Table* the *Line Q, C*, measuring the distance from *Q* to *C*, and setting that distance on the *Table* from *Q* to *G*.

2. Direct your Sights to *D*, and draw your *Line Q, D*, measuring the Distance *Q, D*, as before.



3. Direct your Sights to *E*, and draw the *Line Q, E*.

4. Direct your Sights to *F*, and draw the *Line Q, F*.

5 Direct your Sights to *G*, and draw the *Line Q, G*.

6. Direct your Sights to *H*, and draw the *Line Q, H*.

7. Direct your Sights to *O*, your second Station, and draw the *Line Q, O*, measuring the distance from *Q*, to *O*, and by your *Scale* and *Compass* set off your Stationary distance upon your *Table* from *Q* to *O*.

Having thus made your Observation of all the *Angles* visible from the Station *Q*, and drawn *Lines* from *Q*, upon your *Table*, and likewise measured the distance from *Q*, to every one of them, you may then according to the Directions in the first part of the aforegoing Chapter draw the *Line CD, DE, EF, FG*, and *GH*, and so you have that part of the *Field* finished from your first Station at *Q*.

Then remove your *Instrument* to *O*, your second Station, and there place it in all respects as before, the *Needle* hanging over the *Meridian-Line* of your *Card* represented in the second Station by the *Line M, O, N*.

Having thus placed your *Instrument* at *O*, make observation of the *Angles I, A*, and *B*, in all respects as you did before with the *Angles, C, D, E, F, G, H*, and having drawn the *Lines OI, OA, C, B*, and measured their distances from *O*, draw the *Lines H I, I A, A B*, and *BC*, and so you shall have upon your *Table* the *Figure* of the *Field*.

To perform the work of this Chapter by the Degrees on the Frame of the Table.

THis differeth nothing from the Work of the middle part of the sixth Chapter. Having therefore placed your *Instrument* at *Q*, according to the aforesaid Directions, guide your Sights to *C*, observing the *Degrees* and *Minutes* cut by the *Index* on the Frame of your *Table*, which *Degrees* and *Minutes* place in the first and second Colums of your *Field-Book*. Then measure with your *Chain* the distance from your Station *Q*, to the *Angle C*, and set that distance down in the third and fourth Colums of your *Field-Book*, as already treated of. After this manner do with all the *Angles* visible at your first Station, *viz.* with the

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Angles C, D, E, F, G, H, measuring the distance of every *Line*, as aforesaid.

Then remove your *Instrument* to *O*, your second Station, and make observation of the several *Lines* and *Angles I, A,* and *B,* in all respects, as you did before with the *Lines* and *Angles C, D, E, F, G,* and *H,* which being collected into your *Field-Book* according to the directions aforesaid.

		Degrees.	Min.	Perches.	Prime.
	C	47	15	25	2
	D	88	00	37	0
1 Station Q.	E	135	30	35	1
	F	200	00	28	0
	G	270	15	48	4
	H	341	00	33	0

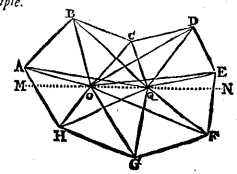
The Stationary distance *O, Q,* 50 *Perches*, and the *Angle O, Q, M,* or *N, O, Q,* 10 *Degrees*, being the Declination of your Stationary *Line* from the *Meridian Line*.

	I	341	30	23	0
2 Station O.	A	30	00	21	1
	C	84	45	35	4

CHAP. VIII.

To take the Plot of a Field upon your Plain Table at two Stations taken within the same Field, without tedious travelling about it, by measuring only the Stationary distance.

IT may so happen that the plotting of a *Field* must be according to these following Directions; yet make as little use thereof as may be, in regard of the acutness of the *Angles*, which is more lyable to Error than any of the former ways, though grounded upon a firm *Geometrical Principle*.



Let *A, B, C, D, E, F,* and *G,* be the *Figure* of a *Field*, and let the two Stations within the same be *O* and *Q*.

Having placed your *Instrument* at *O*, for your first Station, the *Needle* hanging directly over the *Meridian-Line* of the *Card*, you must 1st. Direct your Sights to your first *Angle* at *A*, and draw the *Line O, A.* Secondly Direct your Sights to *B*, and draw the *Line O, B.* Thirdly to *C*, and draw the Line *O, C.* Fourthly to *D*, and draw the Line *O, D.* Fifthly, to *E*, and draw the *Line O, E.* Sixthly to *F*, and draw the *Line O, F.* Seventhly to *G*, and draw the *Line O G*, and Eightly direct your Sights to *H*, and draw the Line *O, A.*

This done, direct your Sights to your second Station at *Q*, and draw the Line *O, Q*, upon your *Table*; then with your *Chain* measure out your Stationary distance *O, Q*, 40 *Perches*; and removing your *Instrument* to *Q*, (the *Needle* over the *Meridian Line* of the *Card*) make observation as before at *O*. that is, direct your Sights first to *A*, drawing the Line *Q, A*, and so proceed to the rest as aforesaid.

By the Figure you may see where the correspondent *Lines* at each Station interfect; as first the *Lines O, A* and *Q, A* interfect, or cross each other at *A*. Secondly, The *Lines O, B*, and *Q, B*, cross at *B*. Thirdly, The *Lines O, C*, and *Q, C*, cross at *C*. Fourthly, The *Lines O, D*, and *Q, D*, cross at *D*. Fifthly, The *Lines O, E*, and *Q, E*, cross at *E*. Sixthly The *Lines O*, F, and *Q*, F, interfect at F. Seventhly, The *Lines O, G*, and *Q G*, cross at *G*, and Eightly, The *Lines O, H*, and *Q, H*, cross each other at *H*.

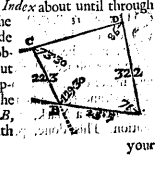
Therefore if from these Points of interfection you draw *Lines* from one to the other, you have upon your Paper the exact proportion of your *Field*, to wit the *Lines A B, B C, C D*, &c.

And by this kind of plotting, you will find a quick dispatch, as not obliged to observe *Degrees* cut, or to measure any Distances, except only between your Stations; but by reason of the acuteness of the *Angles*, (without exact drawing of your *Lines*, and observing the precise *Points* of interfection) you may run into gross Absurdities, and Mistakes.

CHAP. IX.

To take, or draw the Plot of a great Champain Plain, by the help of the Degrees on the Frame of the Table.

LEt *A, B, C, D*, be the *Champain Plain*; then first place your *Instrument* at *A*, laying the *Index* on the *Diameter* of the *Table*, and turning the whole *Instrument* about until through the Sights you see the *Angle* at *B*; where fix the *Instrument*, and turn the *Index* about until through the Sights you see the *Angle* on the other side of your Station at *D*, observing the *Degrees* cut by the *Index*, which suppose 71, which is the quantity of the *Angle B, A, D*. Then measure with your *Chain* the distance *A D*, which is 31 *Perches*, 2 *Primes*; the 71 *Degrees* must be noted in the first Colum of your *Field-Book*, and the 31 *Perches*, 2 *Primes*, in the third and fourth Colums, as hath been shewed before.



Secondly, Remove your *Instrument* to the next *Angle* at *D*, and laying the *Index* on the *Diameter* thereof, direct your Sights to the last Station at *A*, and there fix the *Instrument*; then turn the *Index* about until you see the next *Angle* at *C*, observing the *Degrees* there cut, which suppose 86, which is the quantity of *Degrees* of the *Angle A, D, C*; then measure the distance. *D C*, 31 *Perches* in the third Colum of your *Field-Book*.

Thirdly, Remove your *Instrument* to *G*, and laying the *Index* on the *Diameter* thereof, direct your Sights to *D*, and then fasten the *Instrument*. Then turn the *Index* about until through the Sights you see the next *Angle* at *B*, observing the *Degrees* cut, which suppose 73, and 30 *Minutes*; and measure the Distance *C B*, 22 *Perches*, 3 *Primes*, the 73 *Degrees*, 30 *Minutes* must be placed in the first and second Colums of your *Field-Book*, and the 22 *Perches*, 3 *Primes* in the third and fourth Colums.

Lastly, Remove your *Instrument* to *B*, and laying the *Index* on the *Diameter* thereof, direct your Sights to *C*, and then fix the *Instrument*; then move the *Index* about until through the Sights you see the *Angle* at *A*, where you began, noteing the *Degrees* there cut, which are 129, and 30 *Minutes*, which is the quantity of the *Angle C, B, A*; then with your *Chain* the distance from *B*, to *A*, 25 *Perches*, 5 *Primes*, these 129 *Degrees*, 30 *Minutes*, and the 25 *Perches*, 5 *Primes* must be noted in your *Field-Book*, as aforesaid, and then will they stand thus.

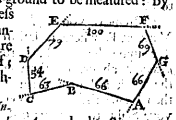
	Degrees.	Minutes.	Perches.	Primes.
A	71	00	32	2
D	86	00	31	0
C	73	30	22	3
B	129	30	25	5

The work of this Chapter may be performed upon your *Plain-Table*, the operation differing nothing from what is here delivered, except only that here you have the *Angles* by the *Degrees* on the *Frame* of your *Table*, and you must by the other attain them by drawing of *Lines* upon the *Table*.

CHAP. X.

To take the Plot of a Wood, or overgrown Ground upon your Plain Table, by going round about it, making Observations at every Angle, when through the thickness of the Wood you cannot see the Angles from any Station taken in the midst thereof, nor from any Angle to all the rest.

IT hath been already treated of plain and open Grounds; it will also be necessary to speak of *Wood-lands*. Suppose *A, B, C, D, E, F, G*, were a Piece of Wood-ground to be measured: By reason of the thickness of the Wood, you cannot come to measure the inside thereof; therefore work without.



1. Place your *Instrument* at the *Angle A*, and directing your Sights to the next *Angle B*, and by the Side thereof, draw a *Line* upon your *Table*, as the *Line B, A*: then measure by the *Hedge-side*, from the *Angle A*, to the *Angle B*, which suppose 66 *Perches*; then from the *Scale* take 66 *Perches*, which distance set upon your *Table* from *A* to *B*.

2. Remove your *Instrument* from *A*, and set up a Mark in the place thereof, and place your *Instrument* at your second *Angle B*; then lay the *Index* upon the *Line A B*, and turn the whole *Instrument* about until through the Sights you see the Mark which you set up at *A*, and then with your Screw fasten the *Instrument* there; then laying the *Index* upon the Point *B*, direct your Sights to the third *Angle* at *C*, and draw the *Line B C*, upon your *Table*; then measuring the distance *B C*, 63 *Perches*, take that distance from your *Scale*, and set it on your *Table* from *B* to *C*.

3. Remove your *Instrument* from *B*, and set a Mark in the room thereof, placing your *Instrument* at *C*, laying the *Index* upon the *Line C B*, and turn the whole *Instrument* about until through the Sights you see the Mark at *B*, and then fasten your *Instrument*; then laying the *Index* on the Point *C*, direct your Sights to *D*, and draw upon your *Table* the *Line C D*; then measure from *C* to *D*, 52 *Perches*, and set that distance upon your *Table* from *C* to *D*.

4. Remove your *Instrument* to *D*, placing a Mark at *C*, where it last stood, and lay the *Index* upon the *Line D C*, turning the whole *Instrument* about till through the Sights you see the

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the Mark at *C*, and there faſten the *Inſtrument*: Then lay the *Index* on the *Point D*, and direct your Sights to *E*, and draw the *Line D E*; then with your *Chain*, meaſure the diſtance *D E*, 76 *Perches*, and ſet that diſtance upon your *Table* from the Point *D*, to *E*.

5. Remove your *Inſtrument* to *E*, placing a Mark at *D*, where it laſt ſtood, and lay the *Index* upon the *Line D E*, turning the whole *Inſtrument* about until through the Sights you ſee the Mark at *D*, and there faſten the *Inſtrument*; then lay the *Index* upon the Point *E*, and direct your Sights to F, and draw the *Line E*, F; then meaſure the diſtance *E*, F, 100 *Pearches*, and ſet that diſtance upon your *Table* from *E*, to F.

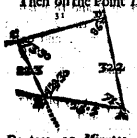
6. Remove your *Inſtrument* to F, placing a Mark at *E*, where it laſt ſtood, and lay the *Index* upon the *Line E*, F, turning the whole *Inſtrument* about, until through the Sights you ſee the Mark at *E*, where faſten the *Inſtrument*: and laying the *Index* on the Point F, direct your Sights to *G*, and draw the *Line F*, *G*, then meaſure the diſtance *F*, *G*, 69 *Perches*, and ſet off that diſtance upon your *Table* from the Point F, to *G*.

7. Remove your *Inſtrument* to *G*, placing the Mark at F, where it laſt ſtood, and lay the *Index* upon the *Line* F, *G*, turning the whole *Inſtrument* about, till through the Sights you ſee the Mark at F; and then faſten the *Inſtrument*; then laying the *Index* upon the Point *G*, direct your Sights to *A*, your firſt Mark where you began, and draw the *Line G*, *A*, which ſhall paſs directly through the Point *A*, where you firſt began, if you have truly wrought.

CHAP. XI.

To Protract, or lay down any Obſervations taken according to the Directions of the tenth Chapter.

YOu muſt conſider which way your *Plot* will extend, and that way draw the *Line A B*; then upon the Point *A*, protract an *Angle* equal to the *Angle B, A, D*, 71 *Degrees*, and draw the *Line A D*; then from your *Scale* take 32 *Perches*, 2 *Primes*, and ſet it upon your Paper from *A*, to *D*.



Then on the Point *D*, protract an *Angle* equal to the *Angle C, D, A*, 86 *Degrees*, and draw the *Line D, C*, then from your *Scale* take 31 *Perches*, and ſet it upon your Paper from *D*, to *C*.

Then on the Point *C*, protract an *Angle* of 73 *Degrees*, 30 *Minutes*, equal to the *Angle D, C, B*, and draw the *Line C, B*, which will interſect the *Line B A*, in *B*, and ſo the *Angle C, B, A*, will contain 129 *Degrees* 30 *Minutes*, as aforeſaid; and the *Lines C, B*, and *B, A*, being meaſured upon your *Scale*, will give you the exact Lengths as found them meaſured in the *Field*.

CHAP. XII.

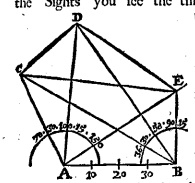
To take the diſtances of ſeveral places one from another; as alſo the diſtance of any of them from your place of ſtanding, it being of excellent uſe to draw a Plot of the moſt conſiderable Marks, or Bounds of a Town, Mannor, &c.

MAke choiſe of ſuch a Place from whence you may ſee all thoſe Places whoſe diſtances are required, and there place your *Inſtrument* exactly level; then move your *Index* about till through the Sights you ſee your firſt Mark, obſerving what *Degrees* your *Index* cuts on the *Frame* of the *Table*, which *Degrees* note down in a *Book*; then your *Index* to your ſecond Mark, and there ſet down the *Degrees* cut as before, and ſet them down; then direct your Sights to your third Mark, which ſet down as aforeſaid, and ſo if there be more, or leſs, till you have gon over them all.

Then for your ſecond Obſervation, chuſe ſome other convenient Place, from whence you may ſee all the Marks, which Stationary diſtance let be as large as your Ground with convenience will permit, and ſo ſituate that the *Index* lying on the *Diameter* of your *Table* at your firſt Station, through the Sights thereof you may ſee your ſecond Station, and likewiſe at the ſecond you may ſee your firſt, ſo that in both Stations the *Diameter* of the *Table*, may be in a right *Line*, at which ſecond Station make Obſervation, as aforeſaid, by noting your *Degrees* cut, and ſetting them down in a *Book* by themſelves with a diſtinction between your firſt and ſecond Station, as alſo *Figures* to your ſeveral Marks, as 1, 2, 3, 4, 5, &c. at both Stations, ſo that you may not miſtake when you come to Protraction.

Let *A, B, C*, be three ſeveral Marks in the *Fields*, or other obſervable Marks, as Churches, Houſes, &c. and let it be required to find the diſtance of either of them from one another, as alſo the diſtance of any of them from *A*, or *B*.

Then make choiſe of your firſt Station at *A*, where placing your *Inſtrument*, direct your Sights to your firſt Mark at *C*, and ſuppoſe the *Index* cuts 70 *Degrees*, 30 *Minutes*, which muſt be noted in a *Book*, as you ſee here following, with the Figure 1, before it ſignifying your firſt Mark, then direct your Sights to *D*, your ſecond Mark, and let the *Degrees* cut be 100 *Degrees*, 15 *Minutes*, which muſt be likewiſe noted in your *Book* as aforeſaid, with the Figure 2, before it; ſignifying your ſecond Mark; then turn your *Index* about, till through the Sights you ſee the third Mark at *E*, the *Index* cutting 150 *Degrees* which note down in your *Book*, with the Figure 3, before it, ſignifying your third Mark. This Figure ſheweth the whole.



This done bring your *Index* to the *Diameter* of your *Table*, that through your Sights you may ſee your ſecond Station at *B*, and meaſure the diſtance of your Station *A, B*, which let be 40 *Tards*.

Then bring your *Inſtrument* to *B*, and the *Index* lying on the *Diameter* thereof, move the *Inſtrument* about, till through the Sights you ſee your firſt Station at *A*, and there fix your *Inſtrument*.

Then move the *Index* about till through the Sights you ſee your firſt Mark at *C*, the *Index* cutting 36 *Degrees*, 30 *Minutes*, which note in your *Book* as aforeſaid, with the Figure 1, before, it ſignifying your firſt Station; Then direct your Sights to *D*, your ſecond Mark, the *Index* cutting 58 *Degrees*; and laſtly direct your Sights to *E*, the *Index* cutting 90 *Degrees*, 15 *Minutes*, which note in your *Book* with the Figure 3, before it, for your third Mark, and then will they ſtand as thus.

	Deg. Min.		Deg. Min.
1, Station	1—70—30	2, Station	1—36—30
	2—100—15		2—58—0
	3—150—00		3—90—15

Your Stationary diſtance 40 *Tards*.

By the help of this *Table* of your Obſervations you may at any time protract the ſame on Paper, or otherwiſe, and then making a *Scale* of equal Parts, anſwerable to the Parts of your Stationary diſtance, you may with your *Compaſſes* meaſure the Diſtance of any of theſe Marks one from another, or from either of your Stations.

CHAP. XIII.

To know whether you have truly wrought, and whether your Plot will cloſe, or not, when you make Obſervation at every Angle of a Field, as in Chapter X.

COllect the quantity of all the *Angles* found at your ſeveral Obſervations into one Sum; then Multiply 180 *Degrees* by a Number leſs by two, than the Number of *Angles* in the *Field*, and if the Product of this *Multiplication* be equal to the Total Sum of all your *Angles*, then have you wrought right, otherwiſe not: For Example.

Take the work of the tenth Chapter, where the *Angles* found were as followeth, the Sum of them being 360 *Degrees*.

	Deg.	Min.
Now becauſe the *Field* conſiſted but of four Sides,	71	00
you muſt *Multiply* 180	86	00
Degrees by 2, (which is a	73	30
Number leſs by 2 than	129	30
the Number of *Angles* in the *Field*) and the *Product* will be 360, which	360 :	00

exactly agreeth with the Sum of all the *Angles* in the *Field*, as found by Obſervation.

CHAP. XIV.

How to find the Area, or Superficial content of any plain Figure, and to reduce irregular Figures into regular Forms, and to find the content thereof.

HAving ſhewed how to draw the *Plot* of a *Field* upon Paper, it will be convenient to ſhew how the content thereof may be attained, that is, how many *Acres*, *Rods* and *Perches* any *Field* ſo plotted, doth contain. For effecting of which, conſider that the Original of the menſuration of all ſuperficial Figures, ſuch as *Land*, *Board*, *Glaſs*, or the like, do depend upon the exact meaſuring of certain regular Figures, as the *Geometrical Square*, the *Long Square*, the *Triangle*, the *Circle*, and the *Trapezium*: ſo that any *Plot* of *Land* to be meaſured, if it be not in the Form of one of theſe Figures it muſt (before it be meaſured) be reduced into ſome of theſe Forms. I ſhall firſt ſhew how to meaſure any of the ſaid

T Figures

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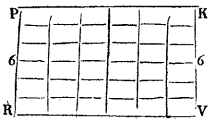
Figures severally by themselves, and then how to reduce any other Figure (how irregular soever it be) into some of these Forms, and then how to measure it by the same Rules; And first.

Of the Geometrical Square.

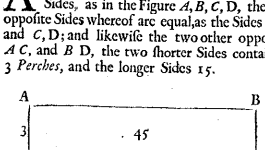
A *Geometrical Square* is a Figure, consisting of 4 equal *Sides*, and *Angles*, as is the Square *P,K,R,V*, whose Sides *PK*, *KV*, *VR*, and *RP*, are all equal, *viz.* 6, be they either *Inches*, *Feet*, *Perches*, or any other measure whatsoever.



Now to find the Superficial content thereof, Multiply any of the Sides in it self, and the *Product* of that *Multiplication* shall be the content of the Square. For Example, Suppose the Square *P,K,R,V*, to be a Piece of *Land*, and the Side thereof to contain 6 *Perches*, therefore Multiply 6 in it self (that, is 6 by 6) and the *Product* is 36, and so many *Perches* doth the Square Piece of *Land P,K,R,V*, contain, as you may perceive by counting of the little Squares within the great one.

Of the large Square.

A Long Square is a Figure consisting of 4 Sides, as in the Figure *A, B, C,* D, the two opposite Sides whereof are equal, as the Sides *A,B*, and *C,* D; and likewise the two other opposites *A C*, and *B* D, the two shorter Sides containing 3 *Perches*, and the longer Sides 15.

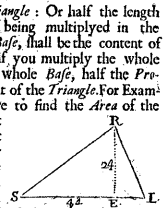


To find the Superficial content of this long Square, multiply one of the shorter Sides by one of the longer, and the *Product* is the Superficial content thereof. For Example, The longer Side of the Square contains 15 *Perches*, and the shorter 3; now if you multiply 15 by 3, the *Product* will be 45, which is the content of the Square in *Perches*.

Of the Triangle.

Although there be several sorts of *Triangles*, yet in respect they are all measured by one and the same *Rule*, one Example therefore shall serve, which take for a general *Rule*.

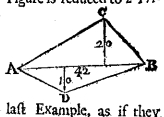
In all right-lin'd *Triangles* whatsoever, half the length of the *Base* being multiplyed by the length of the *Perpendicular*, shall be equal to the *Area*, or content of the *Triangle*: Or half the length of the *Perpendicular* being multiplyed in the length of the whole *Base*, shall be the content of the *Triangle*. Also if you multiply the whole *Perpendicular* by the whole *Base*, half the *Product* shall be the content of the *Triangle*. For Example, Suppose you were to find the *Area* of the *Triangle S, R, L*. First from the *Angle R*, let fall the *Perpendicular R, E*, and let the length thereof be 24 *Perches*; Now if you multiply 12, the half of the *Perpendicular* by 44, the length of the whole *Base*, the *Product* will be 528, and that is the *Area*, or content of the *Triangle*. Or if you multiply 24 which is the length of the *Perpendicular*, by 22 the length of half the *Base*, the *Product* will be 528. Also if you multiply 44 the length of the *Base* by 24, the whole length of the *Perpendicular*, the *Product* will be 1056, the half of which is 528 the *Area*, or content of the *Triangle*.



Of the Trapezium.

A *Trapezium* is a Figure consisting of 4 unequal Sides, and as many unequal *Angles*, as is in the Figure *A,C,B,*D.

To measure this *Trapezium*, first reduce it into 2 *Triangles*, by drawing the *Diagonal Line A,B*, by which means your Figure is reduced to 2 *Triangles*, *viz.* the *Triangles A, C, B*, and *A*, D, *B*; then if you let fall the *Perpendiculars* from the Points D, and *C*, you may measure them by the last Example, as if they were 2 *Triangles*, the Sum whereof being added together will be the *Area*, or Content of the whole *Trapezium*.

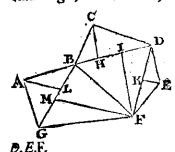


For Example, having drawn the *Line A, B*, and so reduced the Figure into 2 *Triangles*, and let fall the *Perpendiculars* from *C*, and D, (the *Base A, B*, being common to both *Triangles*) suppose the *Perpendicular* at *C*, were 20 *Perches*, the *Perpendicular* at D, 10, and the *Base*, *AB*, (serving for both *Triangles*) 42 *Perches*. If therefore according to your former Directions you multiply 42 the *Base*, by 10, half the *Perpendicular*, the *Product* will be 420 for the content of the *Triangle A, C, B*. In like manner if you Multiply 42 the *Base* by 5, half the other *Perpendicular*, the *Product* will be 210, for the content of the *Triangle A*, D, *B*. Then if you add the Contents of these two *Triangles* together, *viz.* 420 and 210, the Sum of them is 630, which is the content of the whole *Trapezium A,C, B,*D. But this Work may be performed with more brevity thus.

In respect the *Base A, B*, is common to both the *Triangles*, you need therefore do no more but add the two *Perpendiculars* together, the half whereof being Multiplyed by the whole *Base*, the *Product* shall be the content of the *Trapezium*. For Example, The two *Perpendiculars* 10, and 20, being added together make 30, the half of which is 15, which being Multiplyed by 42 (the whole length of the common *Base*) maketh 630, which is the Content of the whole *Trapezium*.

How to reduce Irregular Figures into Trapeziums, and Triangles, and to cast up the Content thereof.

Let *A, B, C, D, E, F, G*, be the Figure of the *Field* drawn upon your *Plain-Table*, or protracted on *Paper*, according to any of the former directions; In regard the *Field* is irregular, that is to say, it is neither a *Circle*, *Triangle*, *Square*, or *Trapezium*, it must therefore before it is measured, be reduced into some of these Forms; which to perform, do thus; Draw *Lines* to every other *Angle*, as the *Lines, GB, BD, DE*, and *FB*, then will the whole Figure be reduced into five *Triangles*, as.



1. The *Triangle G, A, B.*
2. The *Triangle B, C, D.*
3. The *Triangle B, E, F.*
4. The *Triangle F, B, G.*
5. The *Triangle F, B, D.*

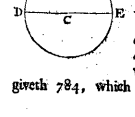
These five *Triangles* must be all measured severally, according to your former Directions shewed to find the Content of a *Triangle*, and then the Contents of the five *Triangles* being added together into one Sum, shall be the *Area* or Content of the whole *Field*. As suppose the *Triangle G, A, B*, should contain 53 *Perches*, the *Triangle B,C,D*, 47 *Perches*, the *Triangle D,E,F*, 40 *Perches*, the *Triangle G, B, F*, 74, and the *Triangle B, F, D*, 68 *Perches*.

These five Numbers added together make 282 *Perches*, which is the *Area* or Content of the whole *Field* in *Perches*.

Here note that at any time when you reduce any Irregular *Plot* into *Triangles*, your Number of *Triangles* will be less by 2, than the Number of the Sides of your *Plot*; as in this the *Plot* consisted of 7 Sides, and you see it is reduced into five *Triangles*.

Of the Circle.

The Proportion of the *Circumference* of any *Circle* is to his *Diameter*, as 7 to 22. Now to find the *Area*, or Content of any *Circle*, Multiply the *Diameter* thereof in it self; and Multiply that Sum by 11, which *Product* being divided by 14, shall give you the *Area* of the *Circle*.



For Example, In the *Circle D, F, G, E*, let the *Diameter* thereof *D, E*, be 28, which Multiplyed in it self, giveth 784, which being Multiplyed by 11, giveth 8624, and being divided by 14, the *Quotient* will be 616 which is the *Area* of the *Circle*.

The Circumference of a Circle being given to find the Diameter.

Multiply the *Circumference* by 7, and divide the *Product* by 22, the *Quotient* shall be the length of the *Diameter*. For Example, Let the *Circumference* of the *Circle D, E, F, G*, be 88, which Multiplyed by 7, giveth 616, which being divided by 22, giveth 28, for the length of the *Diameter D, E*.

CHAP. XV.

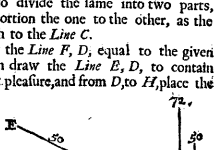
Treats of certain ARITHMETICAL, and GEOMETRICAL PROPOSITIONS, for the Separation, and Division of Land.

Proposition I.

A right Line being given, to divide the same according to any Proportion assigned.

Suppose *A*, be a *Line* given, and let it be required to divide the same into two parts, bearing Proportion the one to the other, as the *Line B*, doth to the *Line C*.

First draw the *Line F, D*, equal to the given *Line A*, then draw the *Line E, D*, to contain any *Angle* at pleasure, and from *D*, to *H*, place the *Line C*, and from *H*, to *E*, place the *Line B*; then draw the *Line E, F*, and lastly draw the *Line H, G*, Parallel to the *Line E, F*, which shall cut the *Line F, D*, in the Point *G*: So is the *Line F, D*, (which is equal to the given *Line A*,) divided in the Point *G*, in Proportion as the *Line B*, is to the *Line C*.



Proposition II.

To perform the same Arithmetically.

Let the *Line A*, be 72, the *Line B*, 50; and the *Line C*, 40, according to which Proportion let it be required to divide the *Line A*. First say by the *Rule* of *Proportion*, if 90 (which is the Sum of the 2 Proportional Terms) give 72, the whole given *Line*, what shall 50, the greater part give? Multiply and Divide and you shall

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shall have in the *Quotient* 40 for the greater part of the *Line A*, which being subtracted from 72, the whole *Line*, there remains 32 for the lesser part.

Proposition III.

To divide a Triangle into 2 parts, according to any Proportion assigned, by a Line drawn from any Angle thereof.

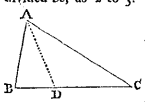
LEt *A, B, C*, be a *Triangle* given, and let it be required to divide the same, by a *Line* drawn from the *Angle A*, into two parts the one bearing Proportion to the other, as the *Line* F, doth to the *Line G*.

By either of the two last Propositions, divide the *Base* of the *Triangle B, C*, in the Point *D*, in Proportion as the *Line* F, is to the *Line G*; then draw the *Line A, D*, which shall divide the *Triangle* according to the given *Proposition*.

Proposition IV.

The Base of the Triangle being known, to perform the former Proposition by Arithmetick.

SUppose the *Base B, C*, to be 40, and let the Proportion into which the *Triangle* is to be divided be, as 2 to 3.

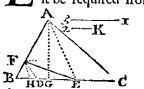


First, Add the two proportional Terms together, 2, and 3, which make 5; then say by the *Rule* of *Proportion*, If 5 give 40, which is the whole *Base*, what shall 3 the greater Term give? Multiply, and Divide, and the *Quotient* will give 24, for the greater *Segment* of the *Base D, C*, which being deducted from the whole *Base* 40, there remains 16 for the lesser *Segment B, D*.

Proposition V.

To divide a Triangle given into two parts, according to any Proposition assigned, by a Line drawn from a Point limited in any of the Sides thereof.

LEt the *Triangle* given be *A, B, C*, and let it be required from the Point *E*, to draw a *Line* that shall divide the *Triangle* into two Parts, bearing Proportion the one to the other, as the *Line I* doth to the *Line K*. First, from the limited Point *E*, draw a *Line* to the opposite *Angle A*, then divide the *Base B, C*, in Proportion as *I*, to *C*, which Point of Division will be at *D*; then draw *D*, F, parallel to A, *E*. Lastly, from F, draw the *Line* F, *E*, which will divide the *Triangle* as *I*, to *K*.



Proposition VI.

To Divide a Triangle, whose AREA is known, into two Parts, from a Point limited in any Side thereof, according to any number of Acres, Rods, or Perches.

LEt the *Triangle* be *A, B, C*, whose quantity is 5 *Acres*, 1 *Rod*; let the limited Point be *E*, in the *Base*; and let it be required from *E*, to divide the *Triangle* into two Parts between *M*, and *N*, to wit to *M*, 3 *Acres*, 3 *Rods* thereof, and to *N*, 1 *Acre*, and 2 *Rods*.

First, reduce the quantity of *N*, being the lesser, into *Perches*, which makes 240; then considering on which Side of the limited Point this Part is to be laid, as towards *B*, measure that Part of the *Base* from *E*, to *B*, 30 *Perches*, whereof take half, which is 15, and thereby divide 240, the part of *N*, and the *Quotient* will be 16, the length of the *Perpendicular* F, *H*, at which *parallel* distance from the *Base B, C*, cut the Side *A, B*, in F, from whence draw the *Line* F, *E*, which shall include the *Triangle* F, *B, E*, containing 1 *Acre*, 2 *Rods*, and the *Trapezium A*, F, *E, C*, contains the residue, *viz.* 3 *Acres* and 3 *Rods*.

CHAP. XVI.

How to lay out several quantities in Common Fields unto several Tenants.

ACcording to the aforesaid Directions, *Plot* out the whole *Field*, Common, or Several, with its particular Bounds, as you observe them in the Survey of the whole Mannor; or if you only Survey that *Particular*, take notice of all the Bounds thereof; then provide a particular *Book*, or *Paper* Ruled into 10 Colums, in the 1 towards the left Hand write the Tenants Name, and the *Tenour* by which he holds the same Land; the next three Colums are to contain the Breadth of every mans Parcels of *Land*, noted over the Head of every Colum with these 3 *Characters* 0, 1, 2, answering to the several Divisions of your *Chain*, 0, signifying *Unites*, 1 *Prime*, and 2 Seconds. In the next 3 Colums is expreſt the length of every Tenants Parcel, having the like *Characters* of 0, 1, 2, over the Head of each Colum as that of the Breadth; and in the three last Colums is to be expreſt the quantity of each Tenants Parcel.

In laying out of several Parcels in this kind, you will use only your *Chain*; then when you begin your Work, first write the Name of the *Field*, and in the first Colum write the Tenants Name, and the *Tenour* by which he holds the same, from what place you begin to Measure, and upon what Point of the *Compass* you pass from thence, and observing this Direction in all the rest you may, if need require, Bound every Parcel.

This being noted in your *Book*, observe the Species or Shape of the Furlong, whether it be all of one Length, or not; if all of one Length then take the Length thereof but once for all; but if different Lengths, then take the Length thereof at every second, or third Breadth, and expreſs the same in your *Book* under the *Title* of Lengths. As for the expressing the several Breadths only cross over the whole Furlong, taking every mans Breadth by the middle thereof, entring the same as you pass along. But in case there be a considerable difference at either end, then take the Breadth at either end, adding them together into one Sum; then take the half of that Sum for your mean, or true Breadth, and enter it in your *Book* or *Paper* under the Title of *Breath*.

In this manner you may proceed from one Furlong to another, until you have gone through the whole *Field*; which when you have done, and noted down the several Lengths and Breadths in your *Book*, Multiply the Length and Breadth of every Parcel together, and so shall you have the quantity of every Parcel by it self, which quantity must be noted down in the three last Colums of your Book, as in the following Example appears.

GRAVEL-PIT FIELD.

Tenants Names	Breadth			Length			Quantity		
	0	1	2	0	1	2	a	r	p
John Price from the Lane Eastward, free	6	8	2	16	2	0	0	2	30
Thomas Jones for two Lives	1	3	2	16	2	0	0	0	21
William Smith by Copy	5	6	3	15	4	2	0	2	7
Robert West, at Will	8	4	1	14	2	3	0	3	0

CHAP. XVII.

To take the Plot of a Mannor, or of divers Severals, whether Wood-lands, or otherwise.

ALthough Practice in the performance hereof is better than many Words; and that the Rules already delivered are sufficient to perform the Work, yet I shall render it as plain as possible. Suppose therefore that the following Figure were part of a Mannor, as the Mannor of *Cainsham*, you must first write the Title thereof in your *Field-Book*, thus.

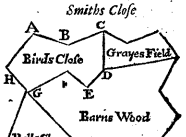
Mannor of Cainsham in Com: Sur: pro Reg. intip 2 Mar. 1685.

THen having your *Field-Book* in a readiness, Ruled and fitted as aforeshewed, write over every Close as you Survey, the Tenants Name, and the Tenure by which he holds the same, as in the following Example; for the first Close, *Richard Price, Birds Close Pasture Free*; then beginning to Survey this Parcel, first place your *Instrument* at *A*, and direct your Sights to *B*, observing the *Degrees* there cut, which let be 195, which must be noted in the first Colum of your *Field-Book*; then with your *Chain* measure the distance from *A*, to *B*, and you shall find it to contain 30 *Perches*, 4 *Primes*, which place in the third and fourth Colums.

2. Remove your *Instrument* to *B*, and direct your Sights to *C*, the *Index* cuting 205 *Degrees*, 30 *Minutes*, which note in the first and second Colums of your *Field-Book*; then measure the distance *B, C*, 26 *Perches*, 7 *Primes*, which observe in the third and fourth Colums; Then in regard you are to leave the *Hedge*, or *Border A, B, C*, adjoyning to *Smiths Close*, (which belongs to another Mannor, and therefore naming is sufficient for your remembrance) draw a *Line* quite cross your *Field-Book*, and in the last Colum thereof, which is very broad, write the name of the *Bounder* which you went against, as in the *Example*. These two Observations being made by the Hedge, or Bounder of *Smiths Close*, therefore against these Observations write *Smiths Close*; and being you are now to leave that Bounder, therefore draw a *Line* quite through your *Field-Book*, which denotes that you leave the Bounder of *Smiths Close*.

3. Place your *Instrument* at *C*, and direct your Sights to *D*, the *Degrees* cut being 120, and 45 *Minutes*, and the distance *C, D*, being 27 *Perches*, 8 *Primes*; these 120 *Degrees*, 45 *Minutes*, must be noted in the first and second Colums of your *Field-Book*, and the 27 *Perches*, 8 *Primes* in the third and fourth Colums. Now because of these three Observations you went against the Hedge, or Bounder of *Grays-Field*, you must against them in the broad Colum of your *Field-Book* set down *Grays Field*; and because at your next Observation you are to leave that Bounder, therefore draw a *Line Cross* your Book, shewing that you have done with that Bounder.

Smiths Close



4. Place your *Instrument* at *D*, and direct your Sights to *E*, the *Index* cutting 86 *Degrees*, 15 *Minutes*, and the distance *D, E*, being 10 *Perches*, 4 *Primes*, the *Degrees* and *Minutes* must be noted in the first and

U second

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second Colums of your *Field Book*, and the 10 *Perches*, 4 *Primes*, in the third and fourth.

5. Remove your *Instrument* to *E*, and direct your Sights to *F*, the *Index* cutting 300 *Degrees*, and the distance *E*,*F*, being 12 *Perches*, 3 *Primes*, the *Degrees* and *Minutes* set down in the second and fifth Colums of your *Field-Book*, and the 12 *Perches*, 3 *Primes* in the third and fourth Colums.

6. Place your *Instrument* at *F*, and direct your Sights to *G*, the *Index* cuting 55 *Degrees*, 30 *Minutes*, and the distance F,*G*, being 16 *Perches*,4 *Primes*; the 55 *Degrees*, 30 *Minutes* must be noted in the first and second Colums of your *Field-Book*, and the 16 *Perches*, 4 *Primes* in the third and fourth.

Now because in these three last Observations you went against the Hedge or Bounder of *Barnswood*, and that you are now to leave it, you must against these three Observations, in the broad Colum of your Book, write *Barnes-wood*, and being now to leave that Bounder, draw a single *Line* cross your Book.

7. Place your *Instrument* at *G*, and direct your Sight to *H*, the *Index* cutting 324 *Degrees*, 15 *Minutes*, and the distance *G*, *H*, being 36 *Perches*, 2 *Primes*, the *Degrees* and *Minutes* must be noted, in the first and second Colums, and the *Perches*, and *Primes* in third and fourth.

8. Remove your *Instrument* to *H*, and direct your Sights to *A*, where you began the *Index*, cutting 107 *Degrees*, 15 *Minutes*, and the distance *H*, *A*, being 34 *Perches*, 6 *Primes*. The *Degrees* and *Minutes* must also be noted in the first, and second *Colums*, and the *Perches*, and *Primes* in the third and fourth. Now because in these two last Observations you went by the Riverside, therefore against them write the River; and because you have now finished your first Close, draw a double *Line* for a remembrance.

Then consider which Close is next fitting to be Surveyed, which let be *Grays Field*, and with-all at what *Angle* it is best to begin, which let be at *C*, and here (for your help when you come to protraction) express in the Title of this second Close at what *Angle* you begin, (unless you had begun where you ended the last): Wherefore seeing you begin at *C*, look in your Book on the Work of your last Close, at what place the Line *B*,*C*, ended, as at the end of 205 *Degrees*, 30 *Minutes*, and 26 *Perches*,7 *Primes*, and against that Number make this * or any other Mark, on the right Side of your down-right *Lines*, and then write your Title for your second Close thus:

Thomas Rich, Grays Field, Free, begin at *

By this means you shall readily know when you come to protraction, where to begin with this Close, and in the *Margin* place (2) for the Number of your second Close, and then proceed in your Work, as before taught for your last Close, until you come to *K*; where observing that you want but one *Line*, as *K*, *D*, to inclose this second Close, and also that this *Angle K*, is the fittest place to begin your third Close at, placing there your *Instrument*, and directing your Sights to *D*, where you are to inclose, and then write in the *Margin* of your Book (against the Degree here taken) draw a short *Line*, as thus—— 21, 30, 40, 2, which serves to put you in mind when you come to *Protraction*, that you are to begin your third *Field*, where now you are at the *Angle K*, where you took your last Sight; and then having inclosed this second Close, proceed to the third from *K*, in the Title whereof you need not make mention at what place you begin, for the former reason, but working in that and all the rest, as before shewed, and if there were never so many Inclosures you may without confusion easily distinguish the Work of the one from the other, and be able to draw a *Plot* thereof at any time, remembring always that these Numbers in the *Margin* of your Book, are to be placed severally in your *Plot* in these Closes they represent; And by this means you are eased of much trouble that you must by the other ways be put to in protracting upon the Table it self: for then in every *Plot* you must write the Name of the Tenant, or the Close, or the *Tenure* or quality thereof, which breeds confusion, and occasioneth much trouble in casting up the Contents.

These *Instructions* being sufficient for the application and use of the *Field Book*, it were convenient to practice the same, and compare his *Book* with the *Plot*, and protracting the same according to the Directions hereafter given.

An Example of a Leaf of the Field-Book, as it ought to be Ruled, and taken according to the preceeding Example.

	Ric: Price, Birdsclose, Pasture, Free.				
	Deg.	Min.	Perch.	Prim.	
(1)	191	00	30	4	Smiths Close.
	205	30	26	7	*
	110	45	27	8	Grays Field.
	86	15	10	4	
	300	00	12	3	Barns Wood.
	55	30	16	4	
	324	15	36	2	The River.
	106	15	34	6	
	Tho: Rich, Grays Field, free from*				
(2)	160	00	12	3	
	180	45	16	2	TheCommon
	95	15	14	7	
(3)	21	30	40	2	Barns Wood.

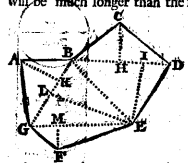
To

CHAP. XVIII.

To protract, or lay down Mountanous, and uneven Grounds, with the best way to find the Area, or Content of such Irregulars.

Let *A*,*B*,*C*,*D*,*E*,*F*,*G*, be a Mountanous Piece of Ground to be measured; First, place your *Instrument* at *A*, and direct your Sights to *B*; then measure the *Line A*, *B*, draw the same by the Side of the *Ruler* upon the Table; then in regard that from *B*, to *C*, there is an Ascent, find the *Horizontal Line* thereof, and draw it upon your *Table*, reckoning thereon the length of the *Hypothenusal Line*; then measure round the Field according to former Directions, and having the Figure thereof upon your *Table*, reduce it into *Trapeziums*, as *A*, *B*, *E*, *G*, and *B*,*C*, *D*, *E*, and the *Triangle G*, *E*, F; then from the *Angles A*,*C*,*E*,*F*, fall the *Perpendiculars*.

Now by reason there are many *Hills* and *Valleys* all over the *Field*, you must measure with your *Chain* in the *Field* over *Hill* and *Dale* from *B*, to *D*, and to the *Line B*, *D*, set the number of *Perches* as you find them by measuring, which will be much longer than the streight *Line B*, *D*, measured on the *Scale*; then by the help of your *Instrument* find the Point *H*, in the *Line B*, *D*, and measure with your *Chain* from *C*, to *H*, over *Hill* and *Dale*, as afore-said, and to the Perpendicular *C*, *H*, set the number, as you find it by the *Chain*; then likewise find the *Perpendicular I*, *E*, and likewise measure that with your *Chain*; all which *Lines* in respect of the *Hills* and *Valleys* will be found much longer than if measured by your *Scale*: Then by the Measured *Lines BD*, *CH*, and *IE*, cast up the contents of the *Trapezium B*, *C*, *D*, *E*, and in this manner cast up the content of the *Trapezium A*,*B*, *E*,*G*, and the *Triangle G*, *E*, *F*; and this is the exactest way to be prescribed from the mensuration of uneven Grounds, which being carefully peformed, will not much vary of the true Content. And to distinguish these from other Grounds, Shadow them off in your *Plot* with *Hills* and *Valleys*, lest any should measure your *Plot* by your *Scale*, and find your work to differ.



CHAP. XIX.

Directions to beautify your Plot when Protracted.

Your *Plot* being protracted as intended, and written the content of each Close about the midst of the same, about the Bounds of every *Field*, with a fine *Pensil* and *Colours*, neatly wash over the same which several proper *Colours*, and use those *Colours* that are transparent, as *Copper-Green*, and *Sap-Green*, for *Greens*; *Yellow Beryl*, *Gombogium*, and *Saffron* for *Yellows*; *Littmus* for *Blue*; *Couchanea*, *Lake*, *Vermillion* and *Red-Lead* for *Reds*; and for mixture of other Colours as your fancy pleaseth for the adornment thereof. Also in your *Wood-land Grounds* draw small *Trees*, and shadow your *Hills*, and uneven Grounds, and for *Rivers* and *High* ways distinguish them by proper Colours. It were also necessary in some convenient corner to draw the *Mariners Compass* according to the Situation of the Ground, with the *Flowerdelis* pointing *North*, and from each Point you may draw *Lines* thwart the *Plot*, the better to know the Point. Also draw your *Scale*, and if there is a convenient place it were convenient to affix the Coat of Arms of the owner thereof.

CHAP. XX.

Of the use of Gunters four Pole-Chain.

In this Chapter for variety's sake, and to render the Treatise of Surveying the more compleat, it will be necessary to let you know how Ground is to be measured with *Gunters Chain*.

This *Chain* containing 4 *Poles*, is divided into 100 *Links*, each *Link* consisting of 7 *Inches* $\frac{92}{100}$ Parts of an *Inch* in Length, which make 66 *Feet* to the whole *Chain*, and 16 $\frac{1}{2}$ *Feet* for each *Pole*.

The Form of the *Field-Book* when you measure with this *Chain*, is as you see, consisting of three Colums, the first for the Degrees of the *Angles* of the *Field*, and the other 2 for *Chains* and *Links*.

Deg.	Chains.	Links.
60	10	00
60	10	00
60	10	00

After having protracted the *Field*, according to the *Field-Book*, and reduced the Figure into *Triangles*, let fall *Perpendiculars*, or the *Base* of each *Triangle*, and measuring them with the same *Scale* into which you protracted the *Plat*, Multiply the half of the *Perpendiculars* in their whole *Bases*, or the half of the *Base* into the whole *Perpendicular*, adding all the Sums of the *Triangles* to-

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together; then if from the total *Product* you cut off by a *Dash*, or *Comma* the 5 laſt Figures towards the right Hand (if there be ſo many) the Figures on the left Hand of the *Comma* are *Acres*, and thoſe to the right Hand of the *Comma* 500000 Parts of an *Acre*. If you Multiply the 5 Figures cut off by 4, the Number of Rods in an *Acre*, and cut off 5 Figures to the right Hand, before the *Comma*, are *Rods*, and the 5 cut off are 10000 Parts of a *Rod*. If you Multiply theſe laſt 5 by 40, the Number of *Poles* in a *Rod* working as before you have *Perches* or *Poles* before the *Comma*, and the remainder *Links*, as according to the *Field-Book*, the *Field* being *Triangular*, the *Baſe* of the *Triangle* is 10 *Chains*, 00 *Links*, the *Perpendicular* let fall from one of the *Angles* on the *Baſe*; as ſuppoſe 6 *Chains*, 7 *Links*, then by Multiplying the whole *Baſe* 10 *Chains* 00 *Links* by the half *Perpendicular* 3 *Chains* 35 *Links*, the *Product* is 33500, the Content of the *Triangle*; by cutting off 5 *Figures* to the right Hand you have 3 *Acres* before the *Comma*. By Multiplying the remainder by 4, and Cutting off the *Product* 5 Figurs, there is 1 *Rod*, and by Multiplying the *Product* by 4, and cutting off 5 Figures, there is 16 *Pole*.

Chain.	Links.
10	00
3	35
3(350	00
4	
1(40000	
40	
16(00000	

If the Figure or *Plot* of the *Field* did conſiſt of more *Triangles*, it is but adding all their Sums together and working as before.

STERIOMETRY.

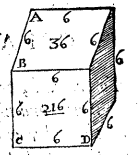
CHAP. XXI.

Giving directions how the Content of moſt Regular Figures may be attained; alſo how to find the Craſſitude, or ſolid Content of any Timber, either ſtanding, rough, or ſquared.

PROP I.

To Meaſure the Solidity of a Cube.

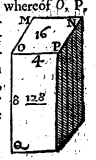
A *Cube* is a Figure comprehended under 6 equal Sides, and each being a *Geometrical Square*. Now for the finding the *Solidity* thereof do thus; Meaſure one of the Sides, which Multiply in it ſelf, which being again Multiplyed by the Side, will give *Solid* Content thereof. For Example, Let the *Figures A, B, C, D*, be a *Cube*, whoſe Side *A, B*, ſuppoſe 6 *Foot*, this 6 being Multiplyed in it ſelf produceth 36, which Multiply by 6, and the *Product* will be 226, and ſo many *Solid Feet* of Timber, or Stone are contained within the *Cube A, B, C, D*.



PROP II.

To meaſure the Solidity of a long Cube.

LEt *M, N, O, P, Q*, be the *Figure* of a long *Cube*, or oblong, the Side whereof *O, P*, is 4 *Foot*, which being Multiplied in it ſelf, gives 16 *Foot* for the *Square M, N, O, P*; this 16 being Multiplied by 8, the length of the Side *O, Q*, gives 128, and ſo many ſolid Feet of *Stone* or *Timber* are contained in the whole Figure *M, N, O, P, Q*.

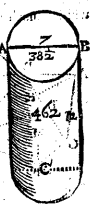


PROP III.

To Meaſure the Solidity of a Cilinder, or Pillar.

LEt the *Cilinder* given be *A, B, C*, the Craſſitude, or ſolid Content whereof is required. Let the *Diameter* of the *Circle* at the end *A, B*, be 7 *Foot*; then is the ſuperficial Content thereof (by Chapter 15) 38 ½ *Foot*.

This Number being Multiplyed by 12, the Length of the *Cilinder*, giveth 462 for the *Craſſitude* of the whole *Cilinder*.

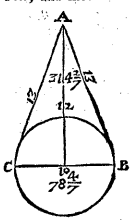


PROP IV.

To Meaſure the Content of a Cone.

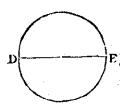
LEt the *Cone* given be *A, B, C*, the Heighth whereof *A, C*, is 12 *Foot*, and the *Diameter* of the *Baſe* is 10, by which the ſuperficial Content of the Circle will be found to be 78 ½, which Multiplied by 4, the third Part of the *Perpendicular* giveth 314 ⅔ for the Content required.

But by reaſon it is not eaſy to meaſure the Altitude of a *Cone*, without the true knowledge of the *Perpendicular*, it will be neceſſary to ſhew how that may be found; Firſt take half the *Diameter C, B*, which is 5, and Multiply it in it ſelf makes 25, which Number keep; then meaſure the Side *C, A*, 13, which Multiply in it ſelf, makes 169, from which take the Square of half the *Baſe*, which is 25, (your Number being found) and there remains 144, the *Square Root* whereof is 12, and that is the Length of the *Perpendicular*.



PROP. V.

To find the Content of a Sphere.



CUbe the *Diameter*, which Multiply by 11, and Divide by 21, gives the *Solidity*.

In this Figure, let *D, E*, the *Diameter* contain 14 *Inches*; Firſt Multiply 14 in it ſelf, which makes 196, which being again Multiplyed by 14, gives 2744; this Number Multiplyed by 11, makes 30184, and divided by 21, is 1437 ⅔ the Content of the *Sphere*.

PROP. VI.

How to meaſure a Piece of Taper-grown Timber.

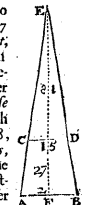
A Piece of *Taper-grown Timber*, is thus meaſured according to the uſual way. Add both the ends together, and take the half of them, and Square it; then Multiply that Square by the length, and you will have the Content: For Example, *Decimally*, Let *A, B, C, D*, be a Piece of *Timber*, and let the end *A, B*, contain 2 *Foot*, and the part *C, D*, 1 ½, which added together makes 3 *Foot* 5 *Primes*, the half whereof is 1 |75 Seconds, which Multiplied in it ſelf gives 3 | 0625 Fourths, which again Multiplyed by the Length 27, gives 82 6875 Fourths, that is 82 *Foot*, and ⁶⁸⁷⁵/₁₀₀₀₀. Parts of a *Foot*, for the Content of the whole Piece.

PROP. VII.

Another way to meaſure a Taper-grown Piece of Timber more exactly.

EVery Piece of *Taper-grown Timber*, the Sides thereof being extended, would be a *Piramid*, as this Piece *A, B, C, D*; if the Sides *A, C*, and *B, D*, were extended till they meet at *E*, they would include the *Piramis A, E, B*. Now to meaſure the *Segment A, B, C, D*, Firſt find the Length of the whole *Piramis, E, F*, which is thus done. Subtract 1 |5 Primes, the Length *C, D*, from the *Baſe*, gives 5 *Primes* for the difference; then ſay by the *Rule* of *Proportion*.

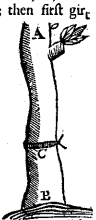
As the Difference 5 *Primes*, is to the *Baſe* 2 *Foot*, ſo is the Length 27 to the whole Length *F, E*, 108 *Foot*; out of which Subtract the Length of the Piece 27 *Foot*, and there remains 81, for the height of the leſſer *Piramis C, D*. Secondly the *Baſe A, B*, Squared, makes 4 *Foot*, which Multiplyed by 2 third Parts of 108, the Length of the whole *Piramis*, which is 36, gives 144 *Foot*, the Content of the whole *Piramis*. Laſtly, find the Content of the leſſer *Piramis C, E, D*, by Multiplying 1 | 5 *Primes*; the *Baſe C, D*; in it ſelf, and it makes 2 |25 Seconds, which Multiplied by one third part of 81, the Heighth of the leſſer *Piramis* 27, which makes 60 |75 Seconds, that is 60 ¾ *Foot* of the Content of the leſſer *Piramis*, which being deducted out of the whole *Piramis*, the remainder will be 83|25 Seconds, the true Content of the Piece *A, B, C, D*.



PROP. VIII.

To meaſure any Timber-Tree as it is ſtanding.

WIth a *Cord* or *Ring* girt the *Tree* about the middle thereof; then meaſure the Length, which is equal to the *Circumference* of a *Circle*, deſcribed upon the mean *Diameter* of the *Tree*, by help of which *Circumference* you muſt by the 2 laſt *Rules* of the Fifteenth Chapter find the *Diameter*, and *Area* thereof; Then meaſure the Length of the *Tree*, which being Multiplied by the Content of the *Circle*, gives the Content of the whole *Tree*. For Example; Let *A, B*, be a ſtanding Tree to be meaſured; then firſt girt the ſame about the middle thereof at *C*, then meaſure the Length of the String, which let be 7 *Foot*, 4 *Inches*, that is 88 *Inches*, which being Multiplied by 7, gives 616, which divided by 22 gives 28 for the Length of the *Diameter*. Having attained the *Diameter* of the *Circle*, find the *Area* thereof thus; Multiply the *Diameter* 28 in it ſelf, which makes 784, this again, Multiplyed by 11, produceth 8624, which divide by 14, and the *Quotient* will be 616, the Content of the ſuppoſed *Circle*, which being Multiplied by 10 *Foot* (which is 120 *Inches*) the Heighth of the *Tree A, B*, the *Product* will be 73920, and ſo many Square *Inches* are in the *Tree*; which being divided by 1728, the Number of *Inches* in a *Foot* of Square *Timber*, the *Quotient* gives 42 ²⁴⁰/₁₇₂₈, and ſo many *Foot* is in the whole *Tree*.



CHAP. XXII.

GAGING.

ALL the difference between *Gaging*, and Meaſuring other *Solids*, is only in this, that the

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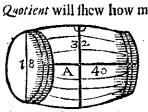
Solids are Measured by Feet and *Inches*, the *Vessels* by *Gallons*, *Quarts*, &c.

In this Art there are two things to be observed; First, that those *Vessels*, being for the most part of Irregular Forms how to reduce them to Regular Propotion; Secondly, to find the true quantity of the *Gallons* in *Cubick Inches*, or parts of a *Foot*: For the first of these, the best way is to measure the *Diameter* of the *Cask*, both at the *Bung* and *Head*; and by their *Diameters* find out the *Area* of their *Circles*; then take 2 Thirds of the *Area* at the *Bung*, and 1 Third at the *Head*, which added together, will be the mean *Area* of the *Vessel*. And if you Multiply this mean *Area* by the Length of the *Vessel*, it will shew how many Solid *Inches* the *Vessel* contains; which if you divide by the Number of Solid *Inches* in one *Gallon*, the *Quotient* will shew how many *Gallons* the *Cask* holds.



For Example, Suppose the *Wine Cask A*, having the *Diameter* at the *Head* 18 *Inches*, and the *Diameter* at the *Bung* 32 *Inches*, and the Length 40 *Inches*, what is the Content?

⅓ Of the *Area* at the *Head* is	84, 823
⅔ of the *Area* at the Bung are	536, 166
The Sum of these two	620, 909
being Multiplyed by the Length	40
	959
makes Solid Inches	24839, 560

which being divided by the Solid *Inches* in one *Gallon* of *Wine*, which are 231 *Inches*, yields for the Content 107 *Gallons*, 530 Parts, that is, somewhat above ½ a *Gallon*.

But there is a difficulty to resolve, that is, How many solid *Inches* there are in a *Gallon*.

As for the *Wine Gallon* it is generally concluded to contain 231 *Cubick Inches*; but some say it is some thing less; but this difference is not so much as others make it in the *Ale-Gallon*, for although most *Gagers*, and the *Coopers* make the *Ale-Gallon* to the *Wine-Gallon* 4 to 5, so that the *Wine-Gallon* being 231 *Inches*, the *Ale-Gallon* is 288 ¾ *Inches*; yet since the Excise, it is accounted by them but 282 *Cubick-Inches*.

According to these *Rules* and Observations, this ensuing Table is calculated, shewing the ⅓ of the *Area* at the *Head*, and ⅔ of the *Area* at the *Bung*, of any *Cask* ready cast up in *Gallons*, and 1000 Parts for Wine measure; so that measuring the *Diameter* of any *Cask* at the *Head*, and *Bung*, and adding the Numbers together, and Multiplying their Sum by the length of the *Cask*, you shall find the Content thereof in *Wine-Gallons*. For Example, Suppose the *Diameter* at the Head to be 18 *Inches*, 0, 367 60
at the *Bung* to be 32 *Inches*, 2, 321

the Sum of these two,	2, 688
Multiplied by the length 40 *Inches*,	40
make very near as before,	107, 502

that is, 107 *Gallons*, and 502 Parts of a *Gallon*, which is a little above one half of a *Gallon*.

A Table for Gaging of Wine Cask.

	Head. G	Parts	Bung. G	Parts		Head. G	Parts	Bung. G	Parts
1	0	001	0	002	31	1	089	2	178
2	0	004	0	009	32	1	160	2	321
3	0	010	0	020	33	1	234	2	468
4	0	018	0	036	34	1	310	2	620
5	0	028	0	056	35	1	388	2	776
6	0	045	0	081	36	1	469	2	938
7	0	056	0	111	37	1	551	3	102
8	0	072	0	114	38	1	636	3	272
9	0	092	0	183	39	1	724	3	448
10	0	113	0	226	40	1	813	3	625
11	0	137	0	274	41	1	904	3	809
12	0	163	0	326	42	2	000	4	000
13	0	192	0	383	43	2	096	4	191
14	0	221	0	444	44	2	194	4	388
15	0	255	0	510	45	2	295	4	588
16	0	290	0	580	46	2	398	4	796
17	0	318	0	657	47	2	504	5	007
18	0	367	0	734	48	2	611	5	222
19	0	409	0	818	49	2	721	5	442
20	0	453	0	906	50	2	833	5	665
21	0	500	1	000	51	2	948	5	895
22	0	548	1	097	52	3	065	6	129
23	0	600	1	199	53	3	184	6	609
24	0	653	1	305	54	3	305	6	865
25	0	708	1	416	55	3	428	7	108
26	0	766	1	532	56	3	554	7	364
27	0	826	1	692	57	3	682	7	625
28	0	888	1	777	58	3	813	7	890
29	0	953	1	906	59	3	945	8	100
30	0	020	2	040	60	4	080		

To Gage a Cask that is not full

A Table for Gaging Wine-Cask that are not full

G	Parts	G	Parts	G	Parts	G	Parts	G	Parts
0	000	13	2630	26	4338	35	5913	52	7672
½	295		2707		4400		5976		7758
1	470	14	2775	27	4462	40	6040	53	7829
	620		2847		4542		6094		7909
2	720	15	2918	28	4585	41	6158	54	7990
	830		2986		4646		6223		8072
3	935	16	3056	29	4706	42	6288	55	8154
	1038		3123		4766		6353		8236
4	1138	17	3189	30	4826	43	6418	56	8319
	1235		3255		4885		6483		8404
5	1339	18	3321	31	4943	44	6548	57	8491
	1420		3387		5000		6612		8580
6	1502	19	3453	32	5057	45	6679	58	8661
	1596		3517		5115		6745		8765
7	1681	20	3582	33	5174	46	6811	59	8862
	1764		3647		5234		6877		8962
8	1846	21	3712	34	5294	47	6944	60	9065
	1918		3777		5354		7012		9170
9	2010	22	3842	35	5415	48	7082	61	9280
	2091		3906		5476		7153		9398
10	2171	23	3960	36	5535	49	7225	62	9530
	2242		4024		5600		7297		9705
11	2328	24	4087	37	5662	50	7370	63	10000
	2405		4150		5724		7444		
12	2481	25	4213	38	5787	51	7519		
	2556		4276		5850		7595		

The

The use of this Table is as followeth.

First measure the *Diameter* of the *Cask* at the *Head* and *Bung*, and thereby you will find the Content of the whole *Cask*; Then measure how many *Inches* deep the *Liquor* in the *Cask* is, and then work by the *Rule of Proportion*; As for Example.

Let the Cask be as before, 32 Inches at the Bung, and the Liquor 24 Inches deep.

As the Diameter at the Bung in Inches — 32
To the depth of the Liquor in Inches — 24
So the Radius of the Table — 10000
To the part Proportional — 7500

Find this Number 7500 in the Table, and it answers very near to 50 ½ *Gallons*.

Then work again thus, omitting the smaller *Fractions*, which are of little concernment.

	Gal.	Part.
As the Gallons of the Radius — 63 —	00	
to the Proportional Gallons found — 50 —	75	
So the content of the whole Cask — 107 —	50	
to the Content of the Liquor being 24 Inches deep —	86	61

That is somewhat above 86 ½ *Gallons*.

Note that one *Foot* Square is near ⅓ a *Gallon*; for there is 144 *Inches* in a *Foot*, which doubled makes 288, which should be the Content of the *Ale Gallon*, although here it is alittle lessened unto 282 *Inches*.

To Gage a Ship, and cast up how many Tuns her Burthen is.

Measure the Length of her *Keel*, the Breadth at the *Mid-ship-Beam*, and the Depth of the *Hold*; Multiply these three one by the other, and divide the *Product* thereof by 100, and so you shall find how many *Tuns* her Burden is; For Example.

Suppose a *Ship* having the Length of her *Keel* 50 *Foot*, and the Breadth at the *Mid-ship Beam* 20, and the Depth in the *Hold* 10 *Foot*; how many *Tuns* will the *Ship* carry?

Multiply 50 by 20, which makes 1000; and that Multiplyed by 10, makes 10000, which divided by 100, cutting off the two last Figures, shews the *Ships Burden* to be 100 *Tuns*.

But this reckoning is only for the *Kings Ships*; As for *Merchants Ships*, who give 20 allowance for *Ordinance*, *Masts*, *Sails*, *Cables*, and *Anchors*, which are all a *Burden*, but no *Tunnage*, you must divide your *Product* by 95; so the foresaid *Ship* will be found to be 105 *Tuns*, 5/19.

But this way of reckoning the *Tunnage* of *Ships*, though it may come near in some *Ships*, yet it may miss much in others; for all *Ships* are not built of the same Fashion; therefore it is the best and surest way to cast up the Content of the *Ship* more exactly according to the *Rules of Art*, with respect had to the *Mold*, and shape of the *Ship*, and so to find out how many *Cubick Feet* the *Ship* doth contain; and every *Cubick Foot* of Water according to some, weighs 55 li. *Averdupois*; but a *Cubick Foot* of Water according to some Artists, weigheth 62 li. 588 parts. Now every *Tun* being 20 hundred Weight, and every Hundred 112 li. which makes 2240 li. divide this by 62 li. 588 parts, it makes 35 *Foot*, 79 parts; so that about 36 *Cubick Feet* makes a *Tun* weight.

But observe that if you measure thus a Ship within, you shall find the Content or *Burden* the *Ship* will hold, or take in. If you measure the *Ship* on the out-side to her *Light-mark*, as she swims being unladen, you shall have the Weight or Content of the empty *Ship*; and if you measure from the *Light-mark* to her full Draught of Water, being laden, that will be the true *Burden* or *Tunnage* of the *Ship*.

Knowing the Measures of a Ship of one Burden, to make another Ship of the same Mold, which shall be double, or treble, or in any Proportion, more or less, to the said Ship.

Multiply the Measurs of the Length, Breadth, and Depth of the *Ship Cubically*, and then double, or treble the *Cube*, and extract the *Cube-Root* thereof.

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together; then if from the total *Product* you cut off by a *Dash*, or *Comma* the 5 laſt Figures towards the right Hand, (if there be ſo many) the Figures on the left Hand of the *Comma* are *Acres*, and thoſe to the right Hand of the *Comma* 500000 Parts of an *Acre*. If you Multiply the 5 Figures cut off by 4, the Number of Rods in an *Acre*, and cut off 5 Figures to the right Hand, before the *Comma*, are *Rods*, and the 5 cut off are 10000 Parts of a *Rod*. If you Multiply theſe laſt 5 by 40, the Number of *Poles* in a *Rod* working as before you have *Perches* or *Poles* before the *Comma*, and the remainder *Links*, as according to the *Field-Book*, the *Field* being *Triangular*, the *Baſe* of the *Triangle* is 10 *Chains*, 00 *Links*, the *Perpendicular* let fall from one of the *Angles* on the *Baſe*; as ſuppoſe 6 *Chains*, 7 *Links*, then by Multiplying the whole *Baſe* 10 *Chains* 00 *Links* by the half *Perpendicular* 3 *Chains* 35 *Links*, the *Product* is 335000, the Content of the *Triangle*; by cutting off 5 *Figures* to the right Hand you have 3 *Acres* before the *Comma*. By Multiplying the remainder by 4, and Cutting off the *Product* 5 Figurs, there is 1 *Rod*, and by Multiplying the *Product* by 4, and cutting off 5 Figures, there is 16 *Pole*.

Chain.	Links.
10	00
3	35
3(350	00
1(40000	
16(00000	

If the Figure or *Plot* of the *Field* did conſiſt of more *Triangles*, it is but adding all their Sums together and working as before.

STERIOMETRY.

CHAP. XXI.

Giving directions how the Content of moſt Regular Figures may be attained; alſo how to find the Craſſitude, or ſolid Content of any Timber, either ſtanding, rough, or ſquared.

PROP I.

To Meaſure the Solidity of a Cube.

A *Cube* is a Figure comprehended under 6 equal Sides, and each being a *Geometrical Square*. Now for the finding the *Solidity* thereof do thus; Meaſure one of the Sides, which Multiply in it ſelf, which being again Multiplyed by by the Side, will give *Solid* Content thereof. For Example, Let the *Figures A, B, C, D*, be a *Cube*, whoſe Side *A, B*, ſuppoſe 6 *Foot*, this 6 being Multiplyed in it ſelf produceth 36, which Multiply by 6, and the *Product* will be 216, and ſo many *Solid Feet* of Timber, or Stone are contained within the *Cube A, B, C, D*.

PROP II.

To meaſure the Solidity of a long Cube.

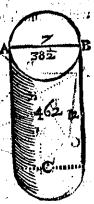
LEt *M, N, O, P, Q*, be the *Figure* of a long *Cube*, or oblong, the Side whereof *O, P* is 4 *Foot*, which being Multiplied in it ſelf, gives 16 *Foot* for the *Square M, N, O, P*; this 16 being Multiplied by 8, the length of the Side *O, Q*, gives 128, and ſo many ſolid Feet of *Stone* or *Timber* are contained in the whole Figure *M, N, O, P, Q*.

PROP III.

To Meaſure the Solidity of a Cilinder, or Pillar.

LEt the *Cilinder* given be *A, B, C*, the Craſſitude, or ſolid Content whereof is required. Let the *Diameter* of the *Circle* at the end *A, B*, be 7 *Foot*; then is the ſuperficial Content thereof (by Chapter 15) 38 ½ *Foot*.

This Number being Multiplyed by 12, the Length of the *Cilinder*, giveth 462 for the *Craſſitude* of the whole *Cilinder*.

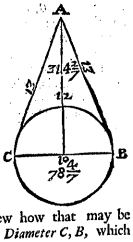


PROP IV.

To Meaſure the Content of a Cone.

LEt the *Cone* given be *A, B, C*, the Heighth whereof *A, C*, is 12 *Foot*, and the *Diameter* of the *Baſe* is 10, by which the ſuperficial Content of the Circle will be found to be 78 ⅝, which Multiplied by 4, the third Part of the *Perpendicular* giveth 314 ⅔ for the Content required.

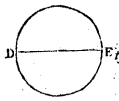
But by reaſon it is not eaſy to meaſure the Altitude of a *Cone*, without the true knowledge of the *Perpendicular*, it will be neceſſary to ſhew how that may be found; Firſt take half the *Diameter C, B*, which



is 5, and Multiply it in it ſelf makes 25, which Number keep; then meaſure the Side *C, A*, 13, which Multiply in it ſelf, makes 169, from which take the Square of half the *Baſe*, which is 25, (your Number being found) and there remains 144, the *Square Root* whereof is 12, and that is the Length of the *Perpendicular*.

PROP V.

To find the Content of a Sphere.



CUbe the *Diameter*, which Multiply by 11, and Divide by 21, gives the *Solidity*.

In this Figure, let *D, E*, the *Diameter* contain 14 *Inches*; Firſt Multiply 14 in it ſelf, which makes 196, which being again Multiplyed by 14, gives 2744; this Number Multiplyed by 11, makes 30184, and divided by 21, is 1437 ⅔ the Content of the *Sphere*.

PROP VI.

How to meaſure a Piece of Taper-grown Timber.

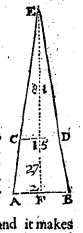
A Piece of *Taper-grown Timber*, is thus meaſured according to the uſual way. Add both the ends together, and take the half of them, and Square it; then Multiply that Square by the length, and you will have the Content: For Example, *Decimally*, Let *A, B, C, D*, be a Piece of *Timber*, and let the end *A, B*, contain 2 *Foot*, and the part *C, D*, 1 ½, which added together makes 3 *Foot* 5 *Primes*, the half whereof is 1 |75 Seconds, which Multiplied in it ſelf gives 3 |0625 Fourths, which again Multiplyed by the Length 27, gives 82 |6875 Fourths, that is 82 *Foot*, and 687½/1000. Parts of a *Foot*, for the Content of the whole Piece.

PROP VII.

Another way to meaſure a Taper-grown Piece of Timber more exactly,

EVery Piece of *Taper-grown Timber*, the Sides thereof being extended, would be a *Pyramid*, as this Piece *A, B, C, D*; if the Sides *A, C*, and *B, D*, were extended till they meet at *E*, they would include the *Piramis A, E, B*. Now to meaſure the *Segment A, B, C, D*, Firſt find the Length of the whole *Piramis, E, F*, which is thus done. Subtract 1 |5 Primes, the Length *C, D*, from the *Baſe*, gives 5 *Primes* for the difference; then ſay by the *Rule* of *Proportion*.

As the Difference 5 *Primes*, is to the *Baſe* 2 *Foot*, ſo is the Length 27 to the whole Length *F, E*, 108 *Foot*, out of which Subtract the Length of the Piece 27 *Foot*, and there remains 81, for the height of the leſſer *Piramis C, D*. Secondly the *Baſe A, B*, Squared, makes 4 *Foot*, which Multiplyed by 2 third Parts of 108, the Length of the whole *Piramis*, which is 36, gives 144 *Foot*, the Content of the whole *Piramis*. Laſtly, find the Content of the leſſer *Piramis C, E, D*; by Multiplying 1 |5 *Primes*, the *Baſe C, D*, in it ſelf, and it makes 2 |25 Seconds, which Multiplied by one third part of 81, the Heighth of the leſſer *Piramis* 27, which makes 60 |75 Seconds, that is 60 ¾ *Foot* of the Content of the leſſer *Piramis*, which being deducted out of the whole *Piramis*, the remainder will be 83 |25 Seconds, the true Content of the Piece *A, B, C, D*.



PROP VIII.

To meaſure any Timber-Tree as it is ſtanding.

WIth a *Cord* or *Ring* girt the *Tree* about the middle thereof; then meaſure the Length, which is equal to the *Circumference* of a *Circle*, deſcribed upon the mean *Diameter* of the *Tree*, by help of which *Circumference* you muſt by the 2 laſt *Rules* of the Fifteenth Chapter find the *Diameter*, and *Area* thereof; Then meaſure the Length of the *Tree*, which being Multiplied by the Content of the *Circle*, gives the Content of the whole *Tree*. For Example; Let *A, B*, be a ſtanding Tree to be meaſured; then firſt girt the ſame about the middle thereof at *C*, then meaſure the Length of the String, which let be 7 *Foot*, 4 *Inches*, that is 88 *Inches*, which being Multiplied by 7, gives 616, which divided by 22 gives 28 for the Length of the *Diameter*. Having attained the *Diameter* of the *Circle*, find the *Area* thereof thus; Multiply the *Diameter* 28 in it ſelf, which makes 784, this again, Multiplyed by 11, produceth 8624, which divide by 14, and the *Quotient* will be 616, the Content of the ſuppoſed *Circle*, which being Multiplied by 10 *Foot* (which is 120 *Inches*) the Heighth of the *Tree A, B*, the *Product* will be 73920, and ſo many Square *Inches* are in the *Tree*; which being divided by 1728, the Number of *Inches* in a *Foot* of Square *Timber*, the *Quotient* gives 42 ⅔, and ſo many *Foot* is in the whole *Tree*.

CHAP. XXII.

GAGING.

ALL the difference between *Gaging*, and Meaſuring other *Solids*, is only in this, that the

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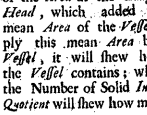
Solids are Measured by Feet and *Inches*, the *Vessels* by *Gallons*, *Quarts*, &c.

In this Art there are two things to be observed; First, that those *Vessels*, being for the most part of Irregular Forms how to reduce them to Regular Propotion; Secondly, to find the true quantity of the *Gallons* in *Cubick Inches*, or parts of a *Foot*: For the first of these, the best way is to measure the *Diameter* of the *Cask*, both at the *Bung* and *Head*; and by their *Diameters* find out the *Area* of their *Circles*; then take 2 Thirds of the *Area* at the *Bung*, and 1 Third at the *Head*, which added together, will be the mean *Area* of the *Vessel*. And if you Multiply this mean *Area* by the Length of the *Vessel*, it will shew how many Solid *Inches* the *Vessel* contains; which if you divide by the Number of Solid *Inches* in one *Gallon*, the *Quotient* will shew how many *Gallons* the *Cask* holds.



For Example, Suppose the *Wine Cask A*, having the *Diameter* at the *Head* 18 *Inches*, and the *Diameter* at the *Bung* 32 *Inches*, and the Length 40 *Inches*, what is the Content?

$\frac{1}{3}$ Of the *Area* at the *Head* is	84, 823
$\frac{2}{3}$ of the *Area* at the Bung are	536, 166
The Sum of these two	620, 909
being Multiplyed by the Length	40
	959

makes Solid Inches 24839, 560

which being divided by the Solid *Inches* in one *Gallon* of *Wine*, which are 231 *Inches*, yields for the Content 107 *Gallons*, 530 Parts, that is, somewhat above $\frac{1}{2}$ a *Gallon*.

But there is a difficulty to resolve, that is, How many Solid *Inches* there are in a *Gallon*.

As for the *Wine Gallon* it is generally concluded to contain 231 *Cubick Inches*; but some say it is some thing less; but this difference is not so much as others make it in the *Ale-Gallon*; for although most *Gagers*, and the *Coopers* make the *Ale-Gallon* to the *Wine-Gallon* 4 to 5, so that the *Wine-Gallon* being 231 *Incoes*, the *Ale-Gallon* is 288 $\frac{3}{4}$ *Inches*; yet since the Excise, it is accounted by them but 282 *Cubick-Inches*.

According to these *Rules* and Observations, this ensuing Table is calculated, shewing the $\frac{1}{3}$ of the *Area* at the *Head*, and $\frac{2}{3}$ of the *Area* at the *Bung*, of any *Cask* ready cast up in *Gallons*, and 1000 Parts for Wine measure; so that measuring the *Diameter* of any *Cask* at the *Head*, and *Bung*, and adding the Numbers together, and Multiplying their Sum by the length of the *Cask*, you shall find the Content thereof in *Wine-Gallons*. For Example, Suppose the *Diameter* at the Head to be 18 *Inches*, 0, 367 60
at the *Bung* to be 32 *Inches*, 2, 321

the Sum of these two,	2, 688
Multiplied by the length 40 *Inches*,	40
make very near as before,	107, 502

that is, 107 *Gallons*, and 502 Parts of a *Gallon*, which is a little above one half of a *Gallon*.

A Table for Gaging of Wine Cask.

Head.	Bung.		Head.	Bung.	
G	Parts	G Parts	G	Parts	G Parts
1	0 001	0 002	31 1	089	2 178
2	0 004	0 009	32 1	160	2 321
3	0 010	0 020	33 1	234	2 468
4	0 018	0 036	34 1	310	2 620
5	0 028	0 056	35 1	388	2 776
6	0 045	0 081	36 1	469	2 938
7	0 056	0 111	37 1	553	3 102
8	0 072	0 114	38 1	636	3 272
9	0 092	0 183	39 1	724	3 448
10	0 113	0 226	40 1	813	3 625
11	0 137	0 274	41 1	904	3 809
12	0 163	0 326	42 2	000	4 000
13	0 192	0 383	43 2	096	4 191
14	0 221	0 444	44 2	194	4 388
15	0 255	0 510	45 2	295	4 588
16	0 290	0 580	46 2	398	4 796
17	0 318	0 657	47 2	504	5 007
18	0 367	0 734	48 2	611	5 222
19	0 409	0 818	49 2	721	5 442
20	0 453	0 906	50 2	833	5 665
21	0 500	1 000	51 2	948	5 895
22	0 548	1 097	52 3	065	6 129
23	0 600	1 199	53 3	184	6 609
24	0 653	1 305	54 3	305	6 865
25	0 708	1 416	55 3	428	7 108
26	0 766	1 532	56 3	554	7 364
27	0 826	1 692	57 3	682	7 625
28	0 888	1 777	58 3	813	7 890
29	0 953	1 906	59 3	945	8 100
30	0 020	2 040	60 4	080	

To Gage a Cask that is not full

A Table for Gaging Wine-Cask that are not full

G	Parts	G	Parts	G	Parts	G	Parts	G	Parts
0	000	13	2630	26	4338	39	5913	52	7672
½	295		2707		4400		5976		7758
1	470	14	2775	27	4462	40	6040	53	7829
	620		2847		4542		6094		7909
2	720	15	2918	28	4585	41	6158	54	7990
	830		2986		4646		6223		8072
3	935	16	3056	29	4706	42	6288	55	8154
	1038		3123		4766		6358		8236
4	1138	17	3189	30	4826	43	6418	56	8319
	1235		3255		4885		6483		8404
5	1339	18	3321	31	4943	44	6548	57	8491
	1430		3387		5000		6613		8580
6	1502	19	3452	32	5057	45	6679	58	8661
	1596		3517		5115		6745		8765
7	1681	20	3582	33	5174	46	6811	59	8862
	1764		3647		5234		6877		8962
8	1846	21	3712	34	5294	47	6944	60	9065
	1918		3777		5354		7012		9170
9	2010	22	3842	35	5415	48	7082	61	9280
	2091		3906		5476		7153		9398
10	2171	23	3960	36	5535	49	7225	62	9530
	2242		4024		5600		7297		9705
11	2328	24	4087	37	5662	50	7370	63	10000
	2405		4150		5724		7444		
12	2481	25	4213	38	5787	51	7519		
	2556		4276		5850		7595		

The

The use of this Table is as followeth.

First measure the *Diameter* of the *Cask* at the *Head* and *Bung*, and thereby you will find the Content of the whole *Cask*; Then measure how many *Inches* deep the *Liquor* in the *Cask* is, and then work by the *Rule of Proportion*; As for Example.

Let the Cask be as before, 32 Inches at the Bung, and the Liquor 24 Inches deep.

As the Diameter at the Bung in Inches	32
To the depth of the Liquor in Inches	24
So the Radius of the Table	10000
To the part Proportional	7500

Find this Number 7500 in the Table, and it answers very near to 50 $\frac{1}{2}$ *Gallons*.

Then work again thus, omitting the smaller *Fractions*, which are of little concernment.

	Gal.	Part.
As the Gallons of the Radius	63	00
to the Proportional Gallons found	50	75
So the content of the whole Cask	107	50
to the Content of the Liquor being 24 Inches deep	86	61

That is somewhat above 86 $\frac{1}{2}$ *Gallons*.

Note that one *Foot* Square is near $\frac{2}{3}$ a *Gallon*; for there is 144 *Inches* in a *Foot*, which doubled makes 288, which should be the Content of the *Ale Gallon*, although here it is alittle lessened unto 282 *Inches*.

To Gage a Ship, and cast up how many Tuns her Burthen is.

Measure the Length of her *Keel*, the Breadth at the *Mid-ship-Beam*, and the Depth of the *Hold*; Multiply these three one by the other, and divide the *Product* thereof by 100, and so you shall find how many *Tuns* her Burden is; For Example.

Suppose a *Ship* having the Length of her *Keel* 50 *Foot*, and the Breadth at the *Mid-ship Beam* 20, and the Depth in the *Hold* 10 *Foot*; how many *Tuns* will the *Ship* carry?

Multiply 50 by 20, which makes 1000; and that Multiplyed by 10, makes 10000, which divided by 100, cutting off the two last Figures, shews the *Ships Burden* to be 100 *Tuns*.

But this reckoning is only for the *Kings Ships*; As for *Merchants Ships*, who give no allowance for *Ordinance*, *Masts*, *Sails*, *Cables*, and *Anchors*, which are all a *Burden*, but no *Tunnage*, you must divide your *Product* by 95; so the foresaid *Ship* will be found to be 105 *Tuns*, $\frac{5}{19}$ Parts.

But this way of reckoning the *Tunnage* of *Ships*, though it may come near in some *Ships*, yet it may miss much in others; for all *Ships* are not built of the same Fashion; therefore it is the best and surest way to cast up the Content of the *Ship* more exactly according to the *Rules of Art*, with respect had to the *Mold*, and shape of the *Ship*, and so to find out how many *Cubick Feet* the *Ship* doth contain; and every *Cubick Foot* of Water according to some, weighs 55 li. *Averdupois*; but a *Cubick Foot* of Water according to some Artists, weigheth 62 li. 588 parts. Now every *Tun* being 20 hundred Weight, and every Hundred 112 li. which makes 2240 li. divide this by 62 li. 588 parts, it makes 35 *Foot*, 79 parts; so that about 36 *Cubick Feet* makes a *Tun* weight.

But observe that if you measure thus a Ship within, you shall find the Content or *Burden* the *Ship* will hold, or take in. If you measure the *Ship* on the out-side to her *Light-mark*, as she swims being unladen, you shall have the Weight or Content of the empty *Ship*; and if you measure from the *Light-mark* to her full Draught of Water, being laden, that will be the true *Burden* or *Tunnage* of the *Ship*.

Knowing the Measures of a Ship of one Burden, to make another Ship of the same Mold, which shall be double, or treble, or in any Proportion, more or less, to the said Ship.

Multiply the Measurs of the Length, Breadth, and Depth of the *Ship Cubically*, and then double, or treble the *Cube*, and extract the *Cube-Root* thereof.

COSMO-

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COSMOGRAPHY, OR ASTRONOMY.

COSMOGRAPHY is an Art that describeth the whole Universe. It hath two parts, *General*, or *Special*.

General teacheth the universal History of the World, which is a great Spherical Body composed of *Heaven*, and the *Elements*; that is to say, the Theatre of the Universe, which is divided into two *Parts* or *Regions*, to wit, *Superiour* and *Constant*, as the *Heavens*; or *Inferiour*, *Inconstant* and *Elementary*, as the *Earth*.

Heaven is the highest Region of the transparent World, exquisite, and not subject to change, which for its perfection and perpetual Motion, as well as for those *Luminary Ornaments* which God has placed in it, may be said to consist of *Divine Matter*, which moves about all the *Elementary Region*.

The *Heavens*, which contain several *Globes* one within another, are divided into two, *viz.* *Empyreal* and *Æthereal*.

The *Empyreal Heaven* (which is called the *Heaven of Heavens*, or the Third Heaven) surrounds all the other, and is so called from its great brightness and splendor; and because it is purer than all the rest, it is thought to be the Throne of *God*, and the habitation of the *blessed Spirits*.

The *Æthereal Heaven* is that where the *Stars*, and other the *Cœlestial Luminaries* are placed, which is extended like a *Pavillion*, and is double; one is called the *Primum Mobile*; the other the *Chrystalline*, as the Region of the fixed *Stars*, the *Firmament*, or of the *Planets*, of which there are seven *Globes* or *Spheres*.

The *Primum Mobile* is the last *Cœlestial Globe* of the *Concentrick Universe*, which has only one daily Motion of Twenty four hours from the *East* to the *West*, between the two *Poles* of the *World*, carrying with it self all the other Inferiour *Heavens*, *Spheres*, and *Cœlestial Bodies*.

The *Chrystalline Heaven* is another *Cœlestial Globe*, which is carried on the *Ecliptick Line*, and *Poles* of the *Zodiack* by its own proper Motion from *West* to *East*, contrary to the Motion of the *Primum Mobile*.

The *Firmament* is another *Cœlestial Globe*, adorned and studded with an infinite number of fix'd *Stars*, which sometimes appears slow, sometimes faster; sometimes advanced, and sometimes depressed; sometimes tending to the North, and sometimes to the South; retaining to it self one proper Motion called *Motus trepidationis*, which is so slow, that it makes but three *Minutes*, and five *Seconds*, in the space of a Year, and its whole Revolution in seven hundred Years.

Under this *Firmament* or *Heaven* of fixed *Stars* are other *Globes* or *Spheres*, every one of which carries its proper *Planet*; as *Saturn*, which is neareſt the *Firmament* goes round once in thirty Years, *Jupiter* in twelve, *Mars* in three, the *Sun* (or rather the *Earth*) *Venus* and *Mercury* in one, and the *Moon* in a Month.

The Inferiour or inconstant Region of the World is called *Elementary*, because the four *Elements* are contained in it, of which there are also three sorts, *viz.* the highest or *Fiery Region*, the middlemost being the Region of *Air*, and the two lowest, that of the *Water* and the *Earth*.

The *Figure* of the whole Universe is represented in a Material *Sphere*, which is a *Mathematical Instrument*, round and solid, consisting of *Circles* accommodated and distinguished in such manner, that it represents to the Eye the rest; also the Motions of the *Circles* and *Orbs* supposed to be in the first *Mobile*, and the Natural *Sphere*; the *Figures* represent the same.

There are two sorts of *Spheres*, *viz.* strait and oblique; the Strait shews the two *Poles* beneath the *Horizon*, and *Æquator* over head; but the Oblique elevates one *Pole* above the *Horizon*, and depresses the other.

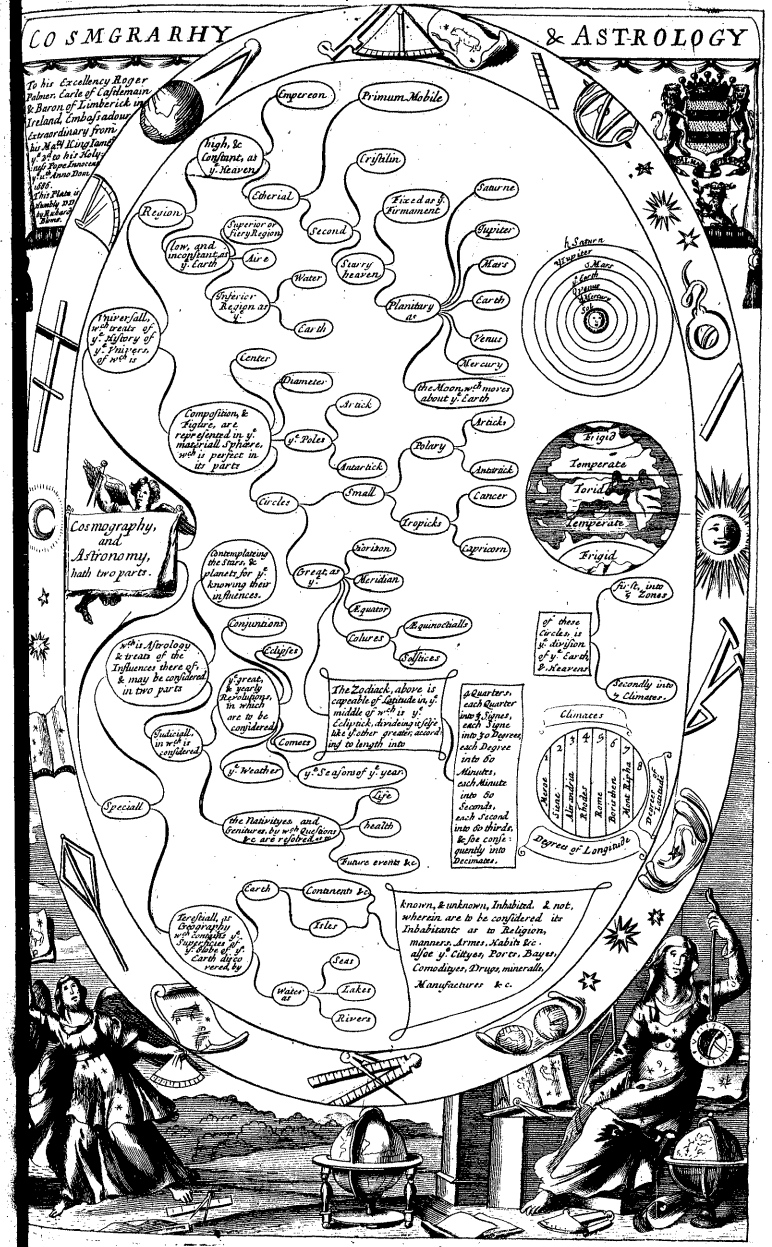
The *Artificial*, or *Material Sphere*, which represents the form and likeness of the Imaginary World; and the *Cœlestial Motions* are fitted to these parts, as well to the *Center*, as to the Diameter, *Poles* and *Circles*.

The *Center* is a *Point* in the midst of the *Sphere*, supplying the place of the *Earth*, whose dimensions contain the number of *Degrees* and *Affections* of the *Zones*, no less than the Circumference it self.

The *Diameter* is a strait Line that passes through the *Center*, and touching both sides of the Circumference divides the *Sphere* into two equal Parts, about which the *Sphere* turns.

The General Opinion is, that the *Imperial Heaven* doth not move, but all the rest do.

The *Primum Mobile* hath but one Motion, which is from East to West, but so swift and violent, that it makes it Revolution (although so vastly



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vastly great) in 24 *Hours*; turning also in the same time and manner, the other *Heavens* under it; although contrary to their own proper Motion, which is from West to East, which is the reason they can't make their own proper Revolution, but in a much longer time; and so much the longer, the nearer they are unto it. This Motion of the *Primum Mobile* is called *Diurnal*, as finishing its Revolution in 24 *Hours*.

The *Primum Mobile* is without *Stars*, being a *Heaven* of a pure and clear substance, like unto the *Imperial*.

The *Heaven* next the *Primum Mobile* is also without *Stars*, and of the same Substance; but it differs from it in that this hath two *Motions*, and the other but one; that is, one upon the *Poles* of the *World*, according to the *Diurnal* Motion, and the other from West to East upon its own *Poles*, but turns so slowly about, that according to *Copernicus*, and some other *Astronomers*, it finisheth its Revolution but once in 2500 Years.

The general Opinion of the *Astronomers*, concerning the thickness and distance of the *Heavens*, how the *Stars* appear through them, and the Magnitude of the *Planets* and fixed *Stars*, is as followeth. The Heaven of the *Moon* contains in thickness 105222 Miles; that of *Mercury* 253372 Miles; that of *Venus* 3274494; that of *Mars* 2630800; that of *Jupiter* 1899654; and that of *Saturn* 19604454 Miles: Yet although these *Heavens* are so vastly thick, they are so transparent and clear, that the *Stars* by reason of their great Light appear with ease through them, indeed being no Impediment thereunto, but appear so small unto us through their great distance; for were not the *Heavens* so thick, they could not have contained each one his *Planet* or *Star*; for according to the Opinion of some *Philosophers* and *Astronomers*, every fixed *Star* is greater than the *Earth*; the like are the *Planets*, except the *Moon*, *Mercury*, and *Venus*. And according to the Judgment of the Ancients, *Saturn* is 79 times bigger than the *Earth*; *Jupiter* 81, *Mars* 2, and the *Sun* 167 times greater than the *Earth*. As for *Venus*, she is said to be 28 times less than the *Earth*; *Mercury* 3143 times, and the *Moon* 39 times less than the *Earth*, which is 21600 Miles in *Compass*.

The Opinion of *Tycho Brahe*, concerning the distance of the *Firmament*, *Sun*, *Moon*, &c. from the *Earth*, is thus; from the *Center* of the *Earth* to the *Sun* there is 3923912 *Miles*, or 1142 *Semidiameters*; from the *Center* of the *Earth* to the *Moon* there is 56 *Semidiameters*; and from the *Center* of the *Earth* to the *Firmament* 48104000 *Miles*, or 14000 *Semidiameters*; Now the *Diameter* of the *Earth* contains 6872 *Miles*, and the *Semidiameter* the Moity, which is 3436 *Miles*.

A *Planet* from the Greek is termed a wandring *Star*, which moves in a *Heaven* by it self; but their various Motions do occasion them to be at a nearer distance sometimes, than at others.

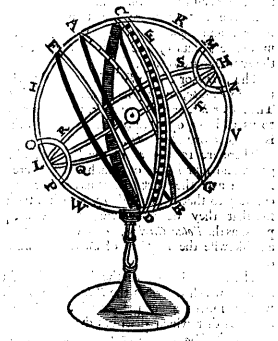
The SPHÆRE.

THe *Sphære* is a Solid Body, contained under one *Superficies*, having in the midst thereof a *Prick*, or *Point*, which is the *Center* of the *Sphære*, from whence all right *Lines* drawn to the *Circumference* are equal the one to the other, as this following *Figure* demonstrates.

By the *Center* is to be understood the *Terrestrial Globe*, and the outward *Circumferences* the *Celestial*.

The *Sphære* is distinguished by 10 *Circles*, whereof 6 are great, and 4 less; and there are only 8 described upon the Body of the *Globe*, limiting the *Zones* and Motion of the *Planets*; as the *Equinoctial*, the *Ecliptick*, the *Equinoctial Colure*, the *Solstitial Colure*, the *Tropicks* of *Cancer* and *Capricorn*, the *Artick Polar Circle*, the *Antartick Polar Circle*, the *Horizon* and *Meridian* are not described upon the Body of the *Globe*, but Artificially annexed thereunto, for the better and more ample use.

The ÆQUATOR.



THe *Æquator*, or *Æquinoctial*, is a great *Circle*, being that strait Line drawn through the middle of each *Hemisphere* which is parallel to the top and bottom of a *Map* of the *World*. It is that great *Circle* which is equally distant from both *Poles*, dividing the *Earth* into two Parts. It is called the *Æquator*, or *Æquinoctial Line*, because when the *Sun* comes to this *Line*, which is twice a Year, *viz.* on the 10*th* of *March*, and on the 12*th* of *September*, the Days and Nights are of an equal length. It likewise shews the *Æquinoctial Points* by cutting the *Zodiack* in the beginning of *Aries* and *Libra*. It is also the Measure of the *Hours*; for by its Elevation 15 *Degrees* above the *Horizon* a compleat Hour is finish'd. It is also the Measure of the rising and setting of the *Stars*, the Term from which the *Declinations* are numbred, and the beginning of *Geographical Latitudes*.

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The Explanation of the Figure of the *Sphære*; *A,B*, is the *Æquinoctial Line*; *C,D*, the *Zodiack*; *E,D*, the *Tropick of Capricorn*; *F,G*, the *Tropick of Cancer*; *H*, the *Pole-Artick*, or *North-Pole*; *L*, the *Pole Antartick*, or *South-Pole*; *M, N*, the *Artick Circle*; *O,P*, the *Antartick Circle*; *Q,R,S,T*, the *Colure* of the *Æquinox*; and *I,K,V,W*, the *Meridian* and *Colure* of the *Solstice*.

The *Æquator*, or *Æquinoctial Line*, is of great use in *Geography*, marking out the distances of places both in *Latitude* and *Longitude*; for from this *Line* the *Degrees* of *Latitude* are begun to be reckoned, going towards either of the *Poles*; and the *Degrees* of *Longitude* are also reckoned on this *Circle*.

Of the Poles.

The *Poles* are the Pricks or Specks at both ends of the *Axis*, or two Points which terminate the said *Axis*, for every *Line* is terminated by two *Points*. Or the *Poles* are two *Points* that are directly at the top and bottom of either of the two great *Meridians*, and are distant from the *Æquator* 90 *Degrees*. In these two Points all the *Meridians* meet.

In the *Sphære* there are two *Poles*, the *Artick*, and *Antartick*, which are called the Immoveable Points of the *Universe* about which the *Heavens* are turned.

The *Artick*, or *North Pole*, is frequently visible to us in *Europe*, and to the greatest part of *Asia*: The *Antartick*, or *Southern Pole*, is not to be seen to us, as being opposite to the *Artick*, so that it is visible to our *Antipodes*.

There are 10 *Circles* of the *Sphære*, *viz.* six great, and four lesser, of which the *Pole* are reckoned; and the lesser *Circles* have their *Centers* contrary to that of the *Sphære*, which is the reason that they do not divide it into two equal parts, as the *Polar Circles*, *Artick* and *Antartick*, and likewise the *Tropicks* of *Capricorn* and *Cancer*.

The *Artick* is one of the less *Circles* of the *Sphære*, which describes the *Pole* of the *Zodiack* when it moves about the *Artick Pole*; The *Antartick* is that which describes the other *Southern Pole* of the *Zodiack* about the *Antartick Pole* of the *Universe*.

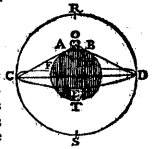
The Horizon.

The *Horizon* is one of the great *Circles*, which divides the *Sphære* into two *Hemisphæres*, *viz.* into that which is above and visible to us, and that which is beneath and invisible unto us, whose *Poles* are the *Zenith*, and the *Nadir*. In this Circle the *Azimuths*, or *Vertical Circles* are numbred; and by this *Circle* our *Days* and *Nights* are measured out, for whilst the *Sun* is above our *Horizon* it is Day, and when under it is Night.

The *Horizon* is either *Natural*, or *Mathematical*. The *Natural Horizon* is that apparent *Circle* which divides the visible part of *Heaven* from the invisible: It extends it self in a strait Line from the Superficies of the *Earth*, every way round about the place on which you stand, even into the very Circumference of the *Heavens*; It is only discerned at *Sea*, or on plain Ground free from *Hills*, *Trees*, or the like Impediments. The *Mathematical Horizon* is that Circle that can't be described on the *Map*, as being alterable, according to the motion of any Man from the place he stands on.

The *Horizon* is of great use for divers occasions: It shews what *Stars* appear to us, and what not, with their Rising and Setting. It directs us to find the height of the *Pole*, *Sun*, and *Stars*, by which the *Latitude* is found out; and by this *Circle* the *Artificial Days* are distinguished from the *Artificial Nights*, as being the Measure thereof.

Although there is properly but one *Horizon*, yet those that Travel by *Sea* or *Land*, do from time to time change their *Horizon*, discovering some part of the *Heavens*, which before could not be seen, because of the roundness of the *Sea* and *Land*; for although one change his *Horizon*, he doth not change it in its kind; for in what place soever he is in, he will see no other *Horizon*, by reason he seeth half of the *Heavens*.



This *Figure* further explains it: The *Globe A, B*, represents the *Earth*; the *Circle C,R,D,S*, the *Heavens*; *R*, the *Zenith*; *S*, the *Nadir*; *C, E,D,F*, the *Rational Horizon*; *O*, the place of the Spectators Eye; *T*, the *Antipodes*, and *O,A,B*, the sensible *Horizon*, whose Semidiameter *O,A*, or *O,B*, is not above three Miles, when the Eye is not above six *Foot* from the Surface of the *Earth*, but increaseth proportionably to the height of the Eye, or thing seen.

Of the Zodiack, Ecliptick, Line, Signs, &c.

The *Zodiack* is another great *Circle*, which alone doth comprehend 16 *Degrees*, and divides the *Sphære* into two equal Parts by cutting the *Æquator* at *Oblique Angles*, or slopingly, into two Points, the one in the beginning of *Aries*, and the other in the beginning of *Libra*; so that one half of the *Circle* declineth towards the North as far as the *Tropick* of *Cancer*; and the other half towards the South, as far as the *Tropick* of *Capricorn*, as appears by the Figure of the *Sphære*. In the middle thereof is the *Ecliptick Line*, in which the *Sun* moves; for when the *Sun* and *Moon* are in *Conjunction*, *Eclipses* happen beneath this *Line*. The other *Planets* pass under the aforesaid *Latitude*; but the *Sun* never goes beyond the *Ecliptick*. This *Ecliptick Line* is divided into 360 *Degrees*, and the Division begins at the first Point of *Aries*, which is the *Æquinox* on the 10th of *March*; from which Point the *Longitude* of the *Stars* are also reckoned, according to the Succession of the *Signs*, *viz.* from *Aries* to *Taurus*, and so forth. The Declination or Distance of the *Ecliptick* from

from the *Æquator* is 23 *Degrees*, 31 *Minutes*: And by the Obliquity of the *Ecliptick Line* with the *Horizon*, the inequality of the Days and Nights are known; also it distinguisheth the time and season of the *Months* and *Year*, as likewise the *Degrees* at which the *Stars* rise and set.

The *Zodiack* is divided into 12 equal Parts, which are called the 12 *Signs*, which are noted by certain *Names* and *Characters*, as followeth, *Aries*, or the *Ram* ♈; *Taurus*, or the *Bull* ♉; *Gemini*, or the *Twins* ♊; *Cancer*, or the *Crab* ♋; *Leo*, or the *Lion* ♌; *Virgo*, or the *Virgin* ♍; *Libra*, or the *Ballance* ♎; *Scorpio*, or the *Scorpion* ♏; *Sagittarius*, or the *Archer* ♐; *Capricorn*, or the *Goat* ♑; *Aquarius*, or the *Pourer of Water* ♒; and *Pisces*, or the *Fish* ♓. Of these *Signs* the first six are called *Northern*, by reason of their being on the North-side of the *Æquator*; and the other six last named are called *Southern Signs*, as being on the South-side of the *Æquator*. And every *Sign* is divided into 30 Parts, called *Degrees*, each *Degree* containing on *Earth* 60 *English Miles*, so that the *Sun* is 30 *Days* (or thereabouts) in each *Sign*; entring on the 10th of *March* into *Aries*, on the 10th of *April* into *Taurus*, on the 11th of *May* into *Gemini*, on the 11th of *June* into *Cancer*, on the 13th of *July* into *Leo*, on the 13th of *August* into *Virgo*, on the 13th of *September* into *Libra*, on the 13th of *October* into *Scorpio*, on the 12th of *November* into *Sagittarius*, on the 11th of *December* into *Capricorn*, on the 10th of *January* into *Aquarius*, and on the 8th of *February* into *Pisces*.

The *Zodiack* contains in Breadth 16 *Degrees*, that is, 8 on each side of the *Ecliptick*, in which the *Planets*, as also the aforesaid *Signs* do move.

Now all these *Circles* of the *Sphære* are divided into two equal Parts, each containing 360 *Degrees*, so called from the Motion of the *Sun* in the *Zodiack*, making almost all the Spaces by its *Diurnal Motion*. Again, each *Degree* is divided into 60 other Proportions, which are called the first *Scruples* or *Minutes*: Each of these are again divided into 60 *Seconds*, every *Second* into 60 *Thirds*, every *Third* into as many *Fourths*, and so consequently into *Decimats*, or *Tenths*, so that one *Minute* is the 60th part of a *Degree*, one *Second* the 60th part of a *Minute*, one *Third* the 60th part of a *Second*; and so consequently according to the Multitudes produced of an *Unite*.

500 *Furlongs* on *Earth* is equivalent to each *Degree* in one of the Great *Circles* in the *Sphære*, so that the *Zodiack* is divided (according to *Longitude*) into four equal parts, which are called *Quadrants*, as all the other Great *Circles* of the *Sphære*.

The *QUADRANT* is likewise divided into three *Signs*, each *Sign* into 30 *Degrees*, each *Degree* into six *Minutes*, and each *Minute* as aforesaid, and so to *Decimats*; from whence may be observed, that all before *Minutes* are intire *Spaces*, or *Distances*; but those that follow are but parts of the Intire.

All the *Circles* of the *Sphære* were invented to separate the *Heavens* into certain *Spaces* and *Regions*, called *Zones* and *Climates*; and as we imagine them in the *Regions* of the *Heavens*, in like manner are they described on the Surface of the *Earth*: And hence it may be concluded, that the four little *Circles* (which hereafter shall be discoursed of) distinguish five *Spaces* in the Surface of the *Heavens* and *Earth*, which are called *Zones* from their likeness to a *Girdle*.

The MERIDIAN.

The *MERIDIAN* is likewise another great *Circle* passing through the *Poles* of the *World*, and the *Zenith*, or *Vertical Point* to any place. It is called *Meridian*, as dividing the Day into two equal parts, being as far from the *Horizon*, or *Sun-Rising* to *Mid-day*, as from *Mid-day* to *Sun-Setting*; and there are as many *Meridians* as you may suppose Points in the *Æquator*; nevertheless *Hydrographers* and *Geographers* do generally draw them but at 10 *Degrees* distance from one another on their *Plats*.

There are not so many *Meridians* as *Zeniths*, for all Places scituated North and South one from another have the same *Meridian*, so that should you Travel never so far *North* from *South*, or *South* from *North*, you would not change your *Meridian*, as being always under the same *Circle*: But it is not so going from *East* to *West*, or from *West* to *East*, for then you change your *Meridian*. And the *Meridian* that passeth through the *Zenith*, passes also through the *Nadir*.

Amongst the *Meridians* there is one most remarkable, which hath the Name of the first *Meridian*, because that from it Eastward the *Longitude* is reckoned upon the *Æquator*; and this *Meridian* on the *Globe*, or *Maps*, is commonly placed with us at the Island *Gratiosa*, which is one of the Isles of the *Azores*; but formerly it the *Canary Islands*, which was the furthest part of the *World* then discovered.

The use of the *Meridian* sheweth the greatest *Altitude* of the *Sun* and *Stars*, and their nearest distance from our *Zenith*, their *Declinations* and *Right-Ascensions*. It also makes the *Longitude*; and by it the *Latitude* is reckoned, and come to the knowledge of the East-part of the *World* from the West-part thereof; and likewise the Midst of the *Artificial Days* and *Nights*, from which the *Hours* are begun to be reckoned.

The COLURES.

The *Colures* are two other *Great Circles* in the *Sphære*, which passing by the *Poles* divide the *Sphære*, and themselves into two equal parts, one of which when it comes by through the Points of the *Æquator*, is called the *Æquinoctial Colure*, as cutting the *Ecliptick* in the beginning of *Aries* and *Libra*, which makes the *Days* and *Nights* equal; the other, when through the Point of the *Solstice* is called the *Colure* of the *Solstices*, which is called the *Circle* of the *Declination*, shewing how far the *Sun* is retired behind the *Æquator*, which is on the 11th of *June*, and the 11th of *December*, at which time the *Sun* seems to stand, for that he can go no further by reason

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reason of the *Tropicks*, which are his Bounds.

The *Solſtices* are diſtinguiſhed by the *Summer Solſtice*, which is when the *Sun* enters the *Tropick* of *Cancer*, which maketh our longeſt Days; the other the *Winter Solſtice*, which is when the *Sun* enters the *Tropick* of *Capricorn*, the time of our ſhorteſt Days.

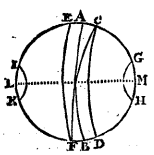
Theſe *Colures* (by interſecting one another) divide themſelves into four *Semi-Circles*, and theſe *Semi-Circles* divide the *Ecliptick* into four equal Parts.

The Points of the *Ecliptick*, that thoſe Interſections paſs through, are called the four *Cardinal Points*, and are of great uſe in *Aſtronomy*; for according to the *Suns* approach to any of them the Seaſon of the Year is altered into *Spring*, *Summer*, *Autumn*, and *Winter*; for the *Spring* begins at the *Vernal Equinox*, or beginning of *Aries*, which is the 10*th* of *March*; the *Summer* at the *Summer Solſtice*, which is the beginning of *Cancer*, being the 11*th* of *June*; the *Autumn* at the *Autumnal Equinox*, which is the beginning of *Libra*, being the 12*th* of *September*; And the *Winter*, at the *Winter Solſtice*, which is the beginning of *Capricorn*, being the 11*th* of *December*.

Of the four Leſſer Circles, viz. *the two* Tropicks, *and the two* Polar Circles.

THe *TROPICKS* are ſo called, becauſe that when the *Sun* cometh at either of theſe two *Circles* he turneth back again; and becauſe one of the *Tropicks* paſſeth through the firſt Point of *Cancer*, it beareth the name of the *Tropick* of *Cancer*, and maketh the *Summer Solſtice*, the *Sun* never going beyond it. The other *Tropick* is of *Capricorn*, ſo called by reaſon of the *Suns* paſſing through the firſt Point, or Degree of *Capricorn*, and maketh the *Winter Solſtice*.

Now foraſmuch as we are to imagine the ſame *Circles* upon the *Earth*, as in the *Heavens*. This *Figure* ſheweth the ſame, with more than upon the *Sphære*.



Suppoſe then you are in a right *Sphære* (where the *Poles* are at the *Horizon*) *A*,*B*, is the *Æquinoctial*.

C,*D*, the *Tropick* of *Cancer*, and *E*, *F*, the *Tropick* of *Capricorn*; and both diſtant from the *Æquinoctial* 23 *Degrees*, 31 *Minutes*.

G,*H*, the *Artick Circle*, and *I*,*K*, the *Antartick Circle*; *C*,*F*, the *Ecliptick*.

The *Points*, or occult *Circle L*, *M*, is the *Horizon*.

The Diſtance between the *Tropicks C*, *D*, and *E*,*F*, is the *Torrid Zone*.

The Diſtance or Interval between the *Tropicks*, and the *Polar Circles*, *viz.* between *C G*, *H D*, and *E I*, *K F*, are the two *Temperate Zones*.

And the Intervals between the *Polar Circles*, and the *Poles*, are the *Frigid Zones*.

The uſe of the *Tropicks* is to mark the longeſt and ſhorteſt Days, as alſo to limit the *Torrid Zone*, as well as the *Suns Courſe*.

The *Polar Circles* are each diſtant from the *Poles* of the World 23 *Degrees*, 30 *Minutes*.

They are called *Polar*, as being ſuppoſed to be in the *Heaven*, exactly where the *Poles* of the *Ecliptick* turn about the *Poles* of the *World*.

Of theſe *Polar Circles* one is called *Artick*, and the other *Antartick*; the *Artick*, becauſe it paſſeth through the Conſtellation of *Urſa Major*; and the *Antartick*, as being oppoſite to the *Artick*.

Theſe *Circles* bound the *Temperate Zones* on the North, and South ſides of them.

Of the ZONES.

A *Zone* is a Circular part of the *Heaven* and *Earth*, contained between two *Parallels*, or *Circles*, of a conſiderable breadth. Of theſe *Zones* there are five, viz. two *Frigid*, two *Temperate*, and one *Torrid*.

The *Frozen Zones* are two parts of the *Earth*, the one comprehended betwixt the *North Pole*, and the *Artick Circle*; and the other between the *South Pole*, and the *Antartick Circle*; They were ſuppoſed by the *Antients* Uninhabited, by reaſon of the extream Cold there always predominating, occaſioned by the remoteneſs of the *Sun*, which ſtrikes his Beams ſo obliquely and weakly upon them.

The *Temperate Zones* are alſo two parts of the *Earth*, the one between the *Tropick* of *Cancer*, and the *Artick Circle*; and the other between the *Tropick* of *Capricorn*, and the *Antartick Circle*. Theſe *Zones* the *Antients* allowed Habitable, by reaſon of their Temperateneſs.

The *Torrid Zone* is that Space of *Earth* contained between the two *Tropicks*, Suppoſed by the Antients Uninhabited, through the rageing heat, the *Sun* never moving out of this *Zone*, but darting its Beams perpendicularly upon it.

But by Experience 'tis found otherwiſe, for both the *Torrid*, and *Frigid Zones* are inhabited, eſpecially the *Torrid* by ſundry Nations, or ſorts of People; and 'tis found that thoſe *Europeans* that have tranſplanted themſelves into thoſe parts, eſpecially the *American Plantations*, have enjoyed a liberal meaſure of Health, and that they are *Countreys* of great fertility and plenty.

The PARALLELS.

THe *PARALEELS* that diſtinguiſh the *Climates*, are *Circles* drawn round the *Globe* between the two *Poles*, as the *Æquator* and the *Tropicks*, which are ſeparate from thoſe of the *Æquator* by a certain equal Space, which is called a *Climate*, by which they ſerve to diſtinguiſh the *Climates*, which ſhew the length of the Day in every *Region* or *Countrey*; and are alſo of uſe for the knowing the *Degrees* of *Latitude*.

The AZIMUTHS.

THe *AZIMUTHS*, or *Vertical Circles*, are great *Circles* paſſing through the *Zenith* and *Nadir*, whoſe *Poles* are the *Zenith* and *Nadir*; And as the *Meridians* cut the *Æquator*, and all the *Parallels* to the *Æquator* at right *Angles*, ſo the *Azimuths* cut the *Horizon*, and all *Almicanthars*, at right *Angles* alſo.

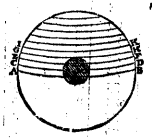
The *Azimuths* (as the *Meridians*) are infinite, and are numbred by *Degrees* from the *Eaſt*, and *Weſt* Points, towards the *North* and *South*, in the *Horizon*.

The *Azimuths* take their begining from the Point, at which the *Sun* riſes, when it is at the *Æquator*, which is the true *Eaſt* and *Weſt*, from whence they are reckoned *Southwards*, and you may ſuppoſe as many *Azimuths* as Points, or *Degrees* in the *Horizon* which are 360. And the *Azimuth* of the *Sun* and *Stars*, is the number of *Degrees* comprehended on the *Horizon*, between the *Azimuth* that paſſeth through the *Center*, of the *Sun* and *Stars*, to the *Horizon*; and the true *Eaſt* and *Weſt* Point, as aforeſaid; Now by the *Latitude* of your place, the *Declination* of the *Sun* and *Stars*, and their *Altitude* above your *Horizon*, you may know the *Azimuth* of the *Sun* and *Stars*. Likewiſe the *Azimuth* ſheweth at what part of the *Heaven*, or point of the *Compaſs* the *Sun* and *Stars* are at any time, being above the *Horizon*; alſo it ſheweth the variation of the *Compaſs*, and how two places bear from one another; for the *Compaſs* being divided into 32 parts, are the ſame as ſo many half of *Azimuths*, or *Vertical Circles* falling down flat as they appear on the *Compaſs*.

The ZENITH, *and* NADIR.

THe *Zenith*, and *Nadir*, are two Points oppoſite to one another. The *Zenith* is that Point in the *Heaven*, which is directly over our Heads; and the *Nadir* is that Point in the *Heaven*, directly under your Feet.

The ALMICANTHARS.



THeſe are little *Circles*, *Parallels*, to the *Horizon*, whoſe *Poles* are the *Zenith*, and the *Nadir* as appears by the *Figure*, where *AB*, being the *Horizon*, *CD*, *EF*, *GH*, *IK*, and the other *Circles*, Parallel to the *Horizon*, are called *Almicanthars*.

The *Almicanthars* are alſo *Circles* of *Altitude*, becauſe when the *Sun*, *Moon*, or any *Star*, is in any number of *Degrees*, above the *Horizon*, 'tis ſaid to have ſo many *Degrees* of *Altitude*, which ſaid *Degrees* are numbred upon the *Particle Circle*, from the *Horizon*, upwards towards the *Zenith*. The *Almicanthars* are alſo infinite as the *Parallels*, *Meridians*, and *Azimuths* are; nevertheleſs there is ſeldom more reckoned than there are *Degrees* from the *Horizon*, to the *Zenith*, which is 90. Theſe *Circles* are of no great uſe; for thoſe of the *Azimuth*, perform the ſame, only ſerving to mark the *Altitude* of the *Sun* and *Stars*.

Of LATITUDE.

THe *Latitude* is an *Arch* of the *Meridian*, comprehended between the *Æquator*, and the *Zenith*, or place enquired after. It is numbred on the firſt *Meridian*, from the *Æquator*, both ways, *viz. North* and *South*, until it comes to the *Poles*, or 90 *Degrees*.

Of LONGITUDE.

THe *Longitude* of a place is the diſtance from the firſt *Meridian*, to the *Meridian* it paſſes through the *Zenith*, or Vertical Point of the place whoſe *Longitude* is deſired to be known; It Signifies the Length of the *Earth*, from *Eaſt* to *Weſt*. But of this more anon.

Of the difference in Latitude, *and* Longitude.

THe difference in *Latitude*, is the *Degrees* and *Minutes*, comprehended between two *Latitudes*; and this is known by adding the leſſer *Latitude* to the greater, when they are on different ſides of the *Æquator*, the one being *North*, and the other *South Latitude*: And by *Subtracting* the leſſer from the greater, when they are both on the ſame ſide the *Æquator*.

The Difference in *Longitude*, is alſo the *Degrees* and *Minutes* comprehended betwixt the two *Meridians*; And this is known by *Subtracting* the leſſer *Longitude* from the greater, and the remainder will be the difference in *Longitude*. But obſerve, that if one *Longitude* be on the *Weſt* ſide of it, and the other on the *Eaſt*; or that one be on the *Eaſt*, and the other on the *Weſt* ſide of it; that you always add 360 *Degrees* to the leaſt of the *Longitudes*, to have their differences.

Of the Meridian Altitude of the SUN *and* STARS, *and of their Declination.*

THe *Meridian Altitude*, is the greateſt Height of the *Sun* or *Stars* above the *Horizon*, which is when they come to our *Meridian*.

The *Declination* is the diſtance of the *Sun* or *Stars* from the *Æquator*; that is to ſay, it is an *Arch* of the *Meridian* comprehended between the *Æquator* and the *Sun*, or *Stars*.

The *Suns* greateſt *Declination* at preſent is 23 *Degrees*, 30 *Minutes*; for ſo ſoon as it comes to the *Tropicks*, it returns towards the *Æquator*, and ſo by little and little his Declination leſſeneth. But when the *Sun* is at the *Equinoctial*, or firſt Point of *Aries*, and *Libra*, which is the 10*th* of *March*, and 11*th* of *September*, he hath no *Declination*.

The *Declination* of the *Stars* differ according to their *Latitude* and *Longitude*.

The *Complement* of the *Altitude* of the *Sun*, *Stars*, and *Pole* above our *Horizon*, is the *Degrees* that the *Sun*, or *Star*, is diſtant from our *Zenith*, which being added to the *Degrees* of *Altitude*, makes up the 90 *Degrees* that our *Zenith* is diſtant from the *Horizon*.

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The *Complement* of the *Declination* is an *Arch*, or number of *Degrees*, comprehended between the *Sun* or *Star*, and the nearest *Pole* of the World.

The *Complement* of the *Latitude* is the Height of the *Æquator* above the *Horizon*.

The distance of the *Sun*, or *Stars* from our *Zenith*, is the *Degrees* and *Minutes*, comprehended between the *Zenith* and *Center* of the *Sun* or *Star*; so that the *Altitude* is always the Complement of their distance from our *Zenith*.

Of the Amplitude Ortive, and Occasive.

THis is the *Degrees* and *Minutes*, that the Sun, or any *Star* rises distant from the true *East Point*. Or to explain it more, It is an *Arch* of the *Horizon*, comprehended between the true *East*, and the Point that the *Sun*, or *Star* riseth at, either *Southwards* or *Northwards*. For when the *Sun* hath *North Declination*, his *Amplitude* is also *North*; and when his *Declination* is *South*, his *Amplitude* is also *South*, which makes it, that from the 10th of *March*, to the 11th of *September*, the *Sun* rises and sets on the *North* side of the *Equinoctial*; and from the 11th of *September*, to the 10th of *March*, his rising and setting is on the *South* side.

Of CLIMES, or CLIMATES.

A *Climate* is a Space comprehended between two *Parallels*, in which there is half an Hours alteration of Day, presently after the begining of it to the end of the same. Where it is to be noted, by how much the further the *Climate* is from the *Æquator*, so much by half an Hour shall the longest Day of that place, exceed the Day that is equal to the Night.

On each side of the *Æquator*, there are 24 *Climates*; the furthest of which ends at that part of the *Earth*, where the longest Day in the Year is 24 *Hours*, which is in the *Latitude* of 66 *Degrees* and 30 *Minutes*, being right under the *Polar Circles*, *viz.* The *Artick*, and *Antartick*, and no further, by reason the longest Day is no more to be accounted by Hours, but rather by *Weeks*, and *Months*; in so much that those inhabiting right under the *North Pole*, have six *Months Day*, whilst the *Sun* is in the *Northern Signs*, and six *Months Night*, when the *Sun* is in the *South Signs*, or hath *Declination South*. Also those that dwell right under the *South Pole*, have the like quantity of *Months Day*, the *Sun* being in the six *Southern Signs*, or having *South Declination*, and the like space of time Night, whilst the *Sun* is in the six *Northern Signs*. But although it is said to be so long *Night*, yet it is not so dark as our *Nights*, for as the *Sun* never goeth lower under the *Horizon* of those People there inhabiting than 23 *Degrees*, the *Twilight*, or Dawning of the Day, doth almost always appear; and there is one part of that time in which it is considerable light, and that is when the *Sun* appears to them by *Refraction*, which is when the *Sun* is near the *Horizon*.

If you would know in what *Climate* a place is situate; subtract the length of the *Æquinoctial* Day, which is 12 Hours from the longest Day of the proposed place, and doubling the remainder to reduce it into half Hours, will shew in what *Climate* the place is situated; for Example, Suppose that at *Oxford* the longest Day in *Summer*, is 16 Hours and an half, if you subtract 12 Hours from it, the Remainder is 4 ½ Hours, which being reduced into half Hours, makes 9; so that *Oxford* is in the 9th *Clime*, from the *Æquinoctial Northwards*.

A Table shewing the longest Day, in every Degree of Latitude.

Latitud. Degrees	Longest Day. H.	M.	S.
1	12	3	28
2	12	6	56
3	12	10	24
4	12	14	0
5	12	17	28
6	12	20	56
7	12	24	48
8	12	28	0
9	12	32	36
10	12	35	12
11	12	38	48
12	12	42	41
13	12	46	8
14	12	49	44
15	12	53	28
16	12	57	20
17	13	1	4
18	13	4	46
19	13	8	56
20	13	12	48
21	13	16	48
22	13	21	4
23	13	25	4
24	13	29	20
25	13	33	36
26	13	38	0
27	13	42	24
28	13	46	16
29	13	51	36
30	13	56	16
31	14	1	12
32	14	6	8
33	14	11	12
34	14	16	24
35	14	21	52
36	14	27	20
37	14	33	4
38	14	38	56
39	14	44	56
40	14	50	22
41	14	57	44
42	15	4	24
43	15	11	20
44	15	18	40
45	15	26	8
46	15	34	8
47	15	42	24

Latitud. Degrees	Longest Day. H.	M.	S.
48	15	51	4
49	16	0	8
50	16	9	24
51	16	19	52
52	16	30	52
53	16	41	52
54	16	54	8
55	17	7	4
56	17	21	4
57	17	36	16
58	17	52	48
59	18	10	48
60	18	30	56
61	18	53	20
62	19	18	24
63	19	48	40
64	20	24	24
65	21	10	32
66	22	20	40

Degrees	Days	H.	M.
67	42	1	40
68	42	1	16
69	54	16	25
70	64	13	46
71	74	0	0
72	84	6	36
73	89	4	58
74	96	17	0
75	104	1	4
76	110	7	27
77	116	14	22
78	122	17	6
79	127	9	55
80	134	4	58
81	139	31	36
82	145	6	43
83	151	2	6
84	156	3	3
85	161	5	23
86	166	11	23
87	171	21	47
88	176	5	28
89	181	21	58
90	187	6	39

The

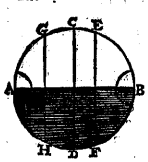
The Position of the Sphære.

IN respect to the *Horizon*, 'tis found that the *Sphære* is constituted into a threefold *Position*; As First, into a direct *Sphære*; Secondly, into a *Parallel Sphære*; and Thirdly, into an *Oblique Sphære*.

A *Direct Sphære* hath both the *Poles* in the *Horizon*, and the *Æquinoctial* transiting the *Zenith*. In a *Direct Sphære* all the *Circles Parallel* to the *Æquator* make right *Angles* with the *Horizon*, and are also divided into two equal parts, by the *Horizon*; and in a *Direct Sphære* the *Sun*, *Moon*, and *Stars* are always 12 Hours above the *Horizon*, and 12 Hours under it, and so by consequence make 12 Hours *Days*, and 12 Hours *Night*.

It is called a *Direct Sphære*, because all the *Celestial Bodies*, as the *Sun*, *Moon*, and *Stars*, *viz.* by the Diurnal Motion of the *Primum Mobile* ascend directly above, and descend directly below the *Horizon*.

Those that Inhabit under the *Æquator* have the *Sphære* thus posited, as in the *Isle* of *Sr. Thomas*, *Sumatra*, *Borneo*, *Celebes*, a great part of *Africa*, and *America*.



A, is the *South Pole*.
B, is the *North Pole*.
A B, is the *Horizon*.
C D, the *Æquinoctial*.
E F, the *Tropick* of *Cancer*.
G H, the *Tropick* of *Capricorn*.

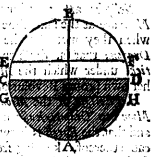
The Space betwixt *G C*, *C E*, and *H D*, *D F*, are the *Parallels* that the *Sun* describes in making his Revolution. The *Arches* under the *Horizon A B*, are the Night *Arches*, and those above it the Day *Arches*.

A *Parallel Sphære* hath one *Pole* of the World in the *Zenith*, the other in the *Nadir*, and the *Equinoctial Line* in the *Horizon*.

In a *Parallel Sphære* all the *Circles* that are *Parallel* to the *Equinoctial*, are also *Parallel* to the *Horizon*; and in a *Parallel Sphære* from the 10th of *March* to the 11th of *September* (the *Sun* being then in the *Northern Signs*, and consequently on the North side of the *Hemisphære*) there are six *Months* Day in the *North*, and six *Months* Night in the *South*; and on the contrary, from the 11th of *September* to the 10th of *March* (the *Sun* being then in the Southernly *Signs*, and by consequence on the South side of the *Horizon*) there are six *Months* Day in the *South*, and six *Months* Night in the *North*.

It is called a *Parallel Sphære*, because the *Sun*, *Moon*, or *Stars*, in the Diurnal Revolution of the *Heavens* neither ascend, or descend, but always move *Parallel* to the *Horizon*.

That is, When one of the *Poles* is in the *Zenith*, and the other in the *Nadir*, and that the *Æquator* is *Parallel* to the *Horizon*; as in this *Figure*, which shews how the *Earth* is posited to those suppo-



sed to dwell under the *Pole*.

An *Oblique Sphære* hath the *Axis* of the *World*, neither *Direct*, nor *Parallel* to the *Horizon*, but lies slopewise from it.

In an *Oblique Sphære* all the *Celestial Bodies*, as the *Sun*, *Moon*, *Stars*, &c. have (in respect of the *Horizon*) oblique and unequal *Ascensions* and *Descensions*, and all the *Lines Parallel* to the *Æquator* make unequal *Angles* with the *Horizon*, and are cut by the *Horizon* into unequal parts; for those *Lines* towards the *Elevated Pole* have a greater proportion of a *Circle* under the *Horizon*, than above it; only the *Æquator*, because it hath the same *Center* with the *Horizon*, doth divide the *Horizon* into two equal parts, and is also divided into two equal parts by the *Horizon*.

According to which it follows, that when the *Sun* is in any part of the *Ecliptick* that declines towards the elevated *Pole*, the *Days* in the elevated *Hemisphære* shall be longer than the *Nights*, and when the *Sun* is in any part of the *Ecliptick* that declines towards the depressed *Pole*, the *Nights* shall be longer than the *Days*; but when the *Sun* is in the *Æquinoctial* (because whether the *Pole* be raised, or depressed) equal proportions remain both above, and under the *Horizon*, therefore the *Days* are of the same length with the *Nights*, and the *Nights* with the *Days*.

Also in an *Oblique Sphære* all those *Stars* that have as great, or greater number of Degrees of *Declination*, than is the elevated *Poles Complement* of *Latitude* to 90, never set, nor come under the *Horizon*; and those *Stars* that have the same Declination above the depressed *Pole*, never rise.

It is called an *Oblique Sphære*, because all the *Circles* of the *Sphære* move Obliquely above the *Horizon*. The *Earth* is thus obliquely posited to all those Nations that Inhabit under any Degree of *Latitude*, either North or Southwards, between the *Æquator* and either *Pole*, as may be seen by this *Figure*.

Of ECLIPSES.

THere are two sorts of *Eclipses*, the one of the *Sun*, and the other of the *Moon*; and of these there are four every Year, *viz.* two of each, although not always visible unto us.

Eclipses

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Eclipses are occasioned when the *Sun* and *Moon* are at the same time under the *Ecliptick*, or when they meet at the Head or Tail of the *Dragon*: that is, those two Points on the *Ecliptick*, under which the *Moon* passeth in making her own proper Revolution.

An *Eclipse* of the *Moon*, is when the *Sun* and *Moon* are *Diametrically* opposed one to another, and that the *Earth* is betwixt them, which is the cause thereof, keeping from her the Light that she borrows of the *Sun*. And these *Eclipses* of the *Moon* do always happen when she is in her Full: And the *Eclipses* of the *Sun*, only when the *Moon* is in Conjunction with him, that is, being interposed betwixt him and the *Earth*; but the *Sun* being so much bigger there can't be a total *Eclipse*, as there may be of the *Moon*, which is less than the *Earth*.

To find the Distances and Magnitudes of the STARS, *and their swift Motions proper for them.*

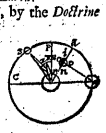
WE will instance in the *Moon*, whose distance may be thus found: First, Find the *Moons* Elevation above the *Horizon* by the help of an *Astronomical Quadrant*; as suppose 30 *Degrees*; then according to this *Figure* conclude the *Arch e, d*, will be 60 *Degrees*: Then to go on to find the quantity of the *Triangle* from the quantity of the *Arch d, e*, judge the *Angle c*, to be 60 *Degrees*; also the quantity of the *Arch h, f*, and consequently of its opposite *Angle* being known, conclude the quantity of the internal *Angle e, a, c*; which for Example, if it be found to be 100 *Degrees*, there will remain 20 *Degrees* for the *Angle e*. Upon this foundation suppose *c, a*, the *Diameter* of the *Earth* to be 1718 *Leagues*, then from the *Precepts* of *Trigonometria* proceed thus: If the *Sign* of the *Angle e*, being 20 *Degrees*, gives 1718 *Leagues* for the Side *a, c*, opposite to it; how many will the Sign of the *Angle c*, give for the Side *a, e*, which is the distance of the *Moon* from the Superficies of the *Earth*, to which the Semidiameter of the *Earth* is to be added to gain the distance from the *Center* of the World?

But this is the more common Method of finding the distance of any *Planet*, which by the help of the *Parallaxis* is performed as followeth, according to this *Figure*. Let the lesser *Circle h, g*, be for the *Globe* of the *Earth*, whose *Semidiameter* is *b, a*; then supposing *l*, to be the *Planet*, let *m*, the true place of the said *Planet* in the *Firmament l, m, e*, be Elevated above the *Horizon* 40 *Degrees*; but let *l*, the *Suns* apparent place, be Elevated only 30 *Degrees*. Then the *Parallaxis* will be only 10 *Degrees*, and consequently the *Angle* opposite to the Arch *l, m*, will be 10 *Degrees*. Therefore so much likewise must the *Angle* be, which is opposite to it at the *Vertex* within the *Triangle*

b, i, a, whereof *b, a*, is known to be 1718 *Leagues*.

Moreover the *Angle a*, becomes known from the *Arch* in *e*, which must of necessity be 50 *Degrees*, from this *Hypothesis*, that the Elevation of the place *m*, was 40 *Degrees*. These things thus laid down, it may be thence inferr'd; If the *Parallelick Angle i*, or rather the Sign of the *Angle i*, being 10 *Degrees*, gives the Side *b, a*, 1718 *Leagues*: How many will the Sign of the *Angle a*, give for the Side *b, i*, which is the distance of the *Superficies* of the *Earth*?

Much after the same Method, by the *Doctrine* of *Trigonometria* some find the *Suns Altitude* as in this *Figure*; Suppose the *Sun* to be in the *Horizon*, and the *Moon* in *i, c, o, n*, to be distant from it 87 *Degrees*; then suppose the *Line a, o*, to be perpendicularly drawn from the *Sun* to the *Moon*, constituting right *Angles* in the *Lunar Body* it self.



Hence if the *Angle* at the *Center* of the World under the *Arch, d a*, be granted to be 87 *Degrees*, it will follow that the *Angle a*, in the *Sun* will be only 3 *Degrees*; whence it may be thus concluded; As the *Angle* of the 3 *Degrees*, at the side of the *Lunar* distance from the *Center* of the World, which by the former *Problem* is taken for known; so is the *Angle a, o, b*, to the side *b a*, which is the *Suns* distance, from the *Center* of the World. Whence if we *Subtract*, the *Semidiameter* of the *Earth*, the *Suns* distance from the *Earths Superficies* will be thence known.

Secondly, From the common Observation, and Computation of *Astronomers*; The *Moons Apogæan*, (that is in its farthest distance,) is distant from the *Center* of the *Earth*, or which is the same thing, 104798 *Leagues*, which number ariseth from the Multiplication of 1718, the number of *Leagues* in the *Earths Semidiameter* by 61.

The *Moons Perigæan*, (that is its least distance from the *Earth*,) is 89336 *Leagues*.

The *Suns Perigæan*, (that is its least distance from the *Earth*,) is 1101 *Semidiameters*, or 1891518 *Leagues*.

But according to the opinion of *Clavius*, the *Sun* is distant from the *Earth*, 2089088 *Leagues*.

The *Stars* of the *Firmament* are distant from the said *Centers* of the *Earth*, 14000 *Semidiameters*, or 20452000 *Leagues*.

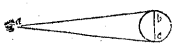
Here we follow the common Observations of *Bourdinus*, and *Clavius*, although some there be that differ, as *Lanspergius*, &c.

Thirdly, As to the *Magnitude* of these *Heavenly Bodies*, and the *Heavens* in which they are; it may be determined divers ways. In the first place several Arguments may be drawn to prove the *Magnitude* of the *Sun* and *Moon* from the Shadow of the *Earth*, For suppose the *Suns* Shadow cast from the *Earth* to be finite, and the Beams at length to meet, as in this *Figure*, otherwise if the said Shadow should be cast in *Infinitum*, it would not only involve the *Moon* when it suffers an *Eclipse*, but also *Mars*, *Jupiter*, and the other *Planets*, and even the very

Stars of the *Firmament*; the contrary whereof is found by experience. Also certain it is that this Shadow of the *Earth*, becomes *Conical*, as appears by the *Moon*, when she is in the *Wain*, for then the Confine of the Shadow, is always Circular, which proceeds from no other cause, than from the round form of the said Shadow. Moreover this is certain, that the *Moon* suffers not an *Eclipse*, except so far as it falls out upon the Shadow of the *Earth*: whereupon that *Eclipse* of the *Moon*, is longest where she is less distant from the *Earth*, because that part of the *Cone* is always biggest which comes nearest to the *Basis*. These things thus supposed; It is first to be inferr'd that the *Sun* is bigger than the *Globe* of the *Earth*, because as oft as the Shadow of the *Opac* Body is *Conical*, and the extream *Rays* at length meet, then always the *Lucid* part is bigger than the *Opac* Body, as appears by the *Figures* at the Letter *c*.

Likewise it is to be inferr'd, that the *Moon* is lesser not only than the *Sun*, but also than the *Globe* of the *Earth*, forasmuch as it is sometimes all hid within the Shadow of the *Earth*, which *Shadow* nevertheless, when as it proceeds from the *Earth* in fashion of a *Top*, or *Cone*, it always so much the more Decreases, by how much the farther it is cast from the *Earth* it self, as is manifest by the aforesaid *Figures*.

Moreover the determined *Magnitude* of those *Bodies* might be assigned from the Principles of *Geometry*, after this manner, according to this *Figure*. If from a known distance by a proper *Instrument*, the *Diameter* of the *Star b, c*, be taken from the Eye *a*, from thence will be produced the *Isosceles Triangle a, b, c*, whose *Angle a*, being known, consequently the quantity of those *Angles* will be known, which are at the Base *b, c*. Whence the *Astronomers* make this Conclusion; As the *Sign* of the *Angle b*, is to the Side, or known distance *a, c*, so is the *Angle a*, to the opposite Side *b, c*.



There is another very common and safe way of inquiring into the *Magnitude* of *Stars*, for that of the *Sun* is particular, since *Astronomers* have by certain reason and experience found, that the *Diameter* of the *Suns* Body possesseth the dimidiated, or half *Degree* of that *Circle* which it runs through in its Diurnal motion: And when by the *Suns* distance from the *Center* of the *World*, the circumference of the *Circle* is found, it will be easie by *Arithmetical Division* to find the quantity of the dimidiated *Degree*. And from thence they affirm, that the *Suns Diameter* contains five *Diameters* and an half of the *Earth*; whence also according to the Precepts of *Cyclometry*, they easily judge of its other *Magnitudes*.

Thus, whereas the *Suns Diameter* is to the *Diameter* of the *Earth*, as $5\frac{1}{2}$ to 1; and whereas the *Spheares* are in a *Triplicate* proportion of their *Diameters*; it follows, that the *Suns* Body contains the *Magnitude* of the *Terrestrial Globe* above 166 times, when at the same time the *Moon* is 40 times less than the *Globe* of the *Earth*.

In like manner by *Geometrical Proportion*, it is found by *Astronomers* that the *Magnitudes* of other *Stars*; affirming, that those *Stars* of the *Firmament*, which are said to be of the first Magnitude, are 107 times bigger than the *Globe* of the *Earth*; and that those which are said to be of the sixth Magnitude exceed the said *Globe* of the *Earth* 18 times, or thereabouts.

Note, that the Duplicate distance of any *Star* from the *Center* of the *Earth*, makes the whole *Diameter* of the *Heaven*, or of that *Circle* which the *Star* runs through in its Diurnal motion. Thus the *Diameter* thereof being known, the Circumference is easily found by the *Rule* of *Three*. So that,

Fourthly, The *Circle* of the *Moons Perigæan* is 561540 *Leagues*, of the *Moons Apogæan* 658730 *Leagues*.

The *Compass* of the *Suns Perigæan* is 11889541 *Leagues*, of the *Suns Apogæan* 13131410 *Leagues*.

The *Compass* of the *Firmament*, as to its greater *Circles*; for Example, the *Æquator* is 151184000 *Leagues*, from which Number (according to the *Precepts* of *Geometry*) may be collected the *Concave Superficies* of the *Firmament*, or Capacity of the whole *World*; and this Capacity however thus stupendiously great, if filled up with little *Sands*, the number thereof will yet not consist of above 50 *Figures*, as according to *Archimedes* may be easily made out by the triple *Rule* of *Proportion*, which is the proper Subject of *Geometry*.

The Substance and Motion of the Stars.

PHilosophers are of Opinion, that the *Stars* are of the same Substance with the *Heavens*, in which they are, yet differ as to their thickness of Body, being thereby capable to receive and retain their borrowed Light of the *Sun*, and by that means become visible unto us in the Nights, when the Light of the *Sun* is departed from our *Horizon*.

These *fixed Stars* have no other Motion than the *Heaven* in which they are placed; yet sometimes seem nearer the *Meridian* than at other times, and the reason is, because of the several Motions of the *Firmament*, in which they are placed. But the *Planets* change their place; yet not by their own Motions, but only through the Motion of the *Heaven*, in which they are fixed.

Of the Cœlestial Motions, and their various Affections.

WE come to treat of the various Aspects of the *Stars*, and of their *swiftness* in Motion, and of their *rising* and *setting*.

These *Aspects* are certain Habitudes, or Dispositions of the *Planets* under the *Zodiack*, from whence certain particular Effects in nature are

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The *Complement* of the *Declination* is an *Arch*, or number of *Degrees*, comprehended between the *Sun* or *Star*, and the nearest *Pole* of the World.

The *Complement* of the *Latitude* is the Height of the *Æquator* above the *Horizon*.

The distance of the *Sun*, or *Stars* from our *Zenith*, is the *Degrees* and *Minutes*, comprehended between the *Zenith* and *Center* of the *Sun* or *Star*; so that the *Altitude* is always the Complement of their distance from our *Zenith*.

Of the Amplitude Ortive, and Occasive.

THis is the *Degrees* and *Minutes*, that the *Sun*, or any *Star* rises distant from the true *East Point*. Or to explain it more, It is an *Arch* of the *Horizon*, comprehended between the true *East*, and the Point that the *Sun*, or *Star* riseth at, either *Southwards* or *Northwards*. For when the *Sun* hath *North Declination*, his *Amplitude* is also *North*; and when his *Declination* is *South*, his *Amplitude* is also *South*, which makes it, that from the *10th* of *March*, to the *11th* of *September*, the *Sun* rises and sets on the *North* side of the *Equinoctial*; and from the *11th* of *September*, to the *10th* of *March*, his rising and setting is on the *South* side.

Of CLIMES, or CLIMATES.

A *Climate* is a Space comprehended between two *Parallels*, in which there is half an Hours alteration of Day, presently after the begining of it to the end of the same. Where it is to be noted, by how much the further the *Climate* is from the *Æquator*, so much by half an Hour shall the longest Day of that place, exceed the Day that is equal to the Night.

On each side of the *Æquator*, there are 24 *Climates*; the furthest of which ends at that part of the *Earth*, where the longest Day in the Year is 24 *Hours*, which is in the *Latitude* of 66 *Degrees* and 30 *Minutes*, being right under the *Polar Circles*, *viz.* the *Artick*, and *Antartick*, and no further, by reason the longest Day is no more to be accounted by Hours, but rather by *Weeks*, and *Months*; in so much that those inhabiting right under the *North Pole*, have six *Months Day*, whilst the *Sun* is in the *Northern Signs*, and six *Months Night*, when the *Sun* is in the *South Signs*, or hath *Declination South*; Also those that dwell right under the *South Pole*, have the like quantity of *Months Day*, the *Sun* being in the six *Southern Signs*, or having *South Declination*, and the like space of time Night, whilst the *Sun* is in the six *Northern Signs*. But although it is said to be so long *Night*, yet it is not so dark as our *Nights*, for as the *Sun* never goeth lower under the *Horizon* of those People there inhabiting than 23 *Degrees*, the *Twilight*, or Dawning of the Day, doth almost always appear; and there is one part of that time in which it is considerable light, and that is when the *Sun* appears to them by *Refraction*, which is when the *Sun* is near the *Horizon*.

If you would know in what *Climate* a place is situate; subtract the length of the *Æquinoctial* Day, which is 12 Hours from the longest Day of the propoſed place, and doubling the remainder to reduce it into half Hours, will shew in what *Climate* the place is situated; for Example, Suppose that at *Oxford* the longest Day in *Summer*, is 16 Hours and an half, if you subtract 12 Hours from it, the Remainder is 4 ½ Hours, which being reduced into half Hours, makes 9; so that *Oxford* is in the *9th Clime*, from the *Equinoctial Northwards*.

A Table shewing the longest Day, in every Degree of Latitude.

Latitud. Degrees	Longest Day. H.	M.	S.
1	12	3	28
2	12	6	56
3	12	10	24
4	12	14	0
5	12	17	28
6	12	20	56
7	12	24	48
8	12	28	0
9	12	32	36
10	12	35	12
11	12	38	48
12	12	42	41
13	12	46	8
14	12	49	44
15	12	53	28
16	12	57	20
17	13	1	4
18	13	4	46
19	13	8	56
20	13	12	48
21	13	16	48
22	13	21	4
23	13	25	4
24	13	29	20
25	13	33	35
26	13	38	0
27	13	42	24
28	13	46	16
29	13	51	36
30	13	56	16
31	14	1	12
32	14	6	8
33	14	11	12
34	14	16	24
35	14	21	52
36	14	27	20
37	14	33	4
38	14	37	36
39	14	44	56
40	14	51	12
41	14	57	44
42	15	4	24
43	15	11	20
44	15	18	40
45	15	26	8
46	15	34	8
47	15	42	24

Latitud. Degrees	Longest Day. H.	M.	S.
48	15	51	4
49	16	0	8
50	16	9	24
51	16	19	52
52	16	30	52
53	16	41	52
54	16	54	8
55	17	7	4
56	17	21	4
57	17	36	16
58	17	52	48
59	18	10	48
60	18	30	56
61	18	53	20
62	19	18	24
63	19	48	40
64	20	24	24
65	21	10	32
66	22	20	40

Degrees	Days	H.	M.
67	42	1	40
68	42	1	16
69	54	16	25
70	64	13	46
71	74	0	0
72	82	6	36
73	89	4	58
74	96	17	0
75	104	1	4
76	110	7	27
77	116	14	22
78	122	17	6
79	127	9	55
80	134	4	58
81	139	31	36
82	145	6	43
83	151	2	6
84	156	3	3
85	161	5	23
86	166	11	23
87	171	21	47
88	176	5	29
89	181	21	58
90	187	6	39

The

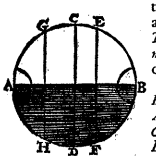
The Position of the Sphære.

IN respect to the *Horizon*, 'tis found that the *Sphære* is constituted into a threefold *Position*; As First, into a *direct Sphære*; Secondly, into a *Parallel Sphære*; and Thirdly, into an *Oblique Sphære*.

A *Direct Sphære* hath both the *Poles* in the *Horizon*, and the *Æquinoctial* transiting the *Zenith*. In a *Direct Sphære* all the *Circles Parallel* to the *Æquator* make right *Angles* with the *Horizon*, and are also divided into two equal parts by the *Horizon*; and in a *Direct Sphære* the *Sun*, *Moon*, and *Stars* are always 12 Hours above the *Horizon*, and 12 Hours under it, and so by consequence make 12 Hours *Days*, and 12 Hours *Night*.

It is called a *Direct Sphære*, because all the *Celestial Bodies*, as the *Sun*, *Moon*, and *Stars*, *viz.* by the Diurnal Motion of the *Primum Mobile* ascend directly above, and descend directly below the *Horizon*.

Those that Inhabit under the *Æquator* have the *Sphære* thus posited, as in the *Isle* of St. *Thomas*, *Sumatra*, *Borneo*, *Celebes*, a great part of *Africa*, and *America*.



A, is the *South Pole*.
B, is the *North Pole*.
A B, is the *Horizon*.
C D, the *Æquinoctial*.
E F, the *Tropick* of *Cancer*.
G H, the *Tropick* of *Capricorn*.

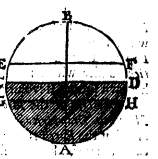
The Space betwixt *G C*, *C E*, and *H D*, *D F*, are the *Parallels* that the *Sun* describes in making his Revolution. The *Arches* under the *Horizon* *A B*, are the Night *Arches*, and those above it the Day *Arches*.

A *Parallel Sphære* hath one *Pole* of the World in the *Zenith*, the other in the *Nadir*, and the *Equinoctial Line* in the *Horizon*.

In a *Parallel Sphære* all the *Circles* that are *Parallel* to the *Equinoctial*, are also *Parallel* to the *Horizon*; and in a *Parallel Sphære* from the *10th* of *March* to the *11th* of *September* (the *Sun* being then in the *Northern Signs*, and consequently on the North side of the *Hemi(sphære)*) there are six *Months* Day in the *North*, and six *Months* Night in the *South*; and on the contrary, from the *11th* of *September* to the *10th* of *March* (the *Sun* being then in the Southernly *Signs*, and by consequence on the South-side of the *Horizon*) there are six *Months* Day in the *South*, and six *Months* Night in the *North*.

It is called a *Parallel Sphære*, because the *Sun*, *Moon*, or *Stars*, in the Diurnal Revolution of the *Heavens* neither ascend, or descend, but always move *Parallel* to the *Horizon*.

That is, When one of the *Poles* is in the *Zenith*, and the other in the *Nadir*, and that the *Æquator* is *Parallel* to the *Horizon*; as in this *Figure*, which shews how the *Earth* is posited to those suppoſed to dwell under the *Pole*.



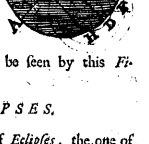
An *Oblique Sphære* hath the *Axis* of the *World*, neither *Direct*, nor *Parallel* to the *Horizon*, but lies slopewise from it.

In an *Oblique Sphære* all the *Celestial Bodies*, as the *Sun*, *Moon*, *Stars*, &c. have (in respect of the *Horizon*) oblique and unequal *Ascensions* and *Descensions*, and all the *Lines Parallel* to the *Æquator* make unequal *Angles* with the *Horizon*, and are cut by the *Horizon* into unequal parts; for those *Lines* towards the *Elevated Pole* have a greater proportion of a *Circle* under the *Horizon*, than above it; only the *Æquator*, because it hath the same *Center* with the *Horizon*, doth divide the *Horizon* into two equal parts, and is also divided into two equal parts by the *Horizon*.

According to which it follows, that when the *Sun* is in any part of the *Ecliptick* that declines towards the elevated *Pole*, the *Days* in the elevated *Hemisphære* shall be longer than the *Nights*, and when the *Sun* is in any part of the *Ecliptick* that declines towards the depressed *Pole*, the *Nights* shall be longer than the *Days*; but when the *Sun* is in the *Æquinoctial* (because whether the *Pole* be raised, or depressed) equal proportions remain both above, and under the *Horizon*, therefore the *Days* are of the same length with the *Nights*, and the *Nights* with the *Days*.

Also in an *Oblique Sphære* all those *Stars* that have as great, or greater number of Degrees of *Declination*, than is the elevated *Poles Complement* of *Latitude* to 90, never set, nor come under the *Horizon*; and those *Stars* that have the same Declination above the depressed *Pole*, never rise.

It is called an *Oblique Sphære*, because all the *Circles* of the *Sphære* move Obliquely above the *Horizon*. The *Earth* is thus obliquely posited to all those Nations that Inhabit under any Degree of *Latitude*, either North or Southwards, between the *Æquator* and either *Pole*, as may be seen by this *Figure*.



Of ECLIPSES.

THere are two sorts of *Eclipses*, the one of the *Sun*, and the other of the *Moon*; and of these there are four every Year, *viz.* two of each, although not always visible unto us.

Eclipses

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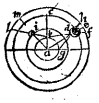
Eclipses are occasioned when the *Sun* and *Moon* are at the same time under the *Ecliptick*, or when they meet at the Head or Tail of the *Dragon*; that is, those two Points on the *Ecliptick*, under which the *Moon* passeth in making her own proper Revolution.

An *Eclipse* of the *Moon*, is when the *Sun* and *Moon* are *Diametrically* opposed one to another, and that the *Earth* is betwixt them, which is the cause thereof, keeping from her the Light that she borrows of the *Sun*. And these *Eclipses* of the *Moon* do always happen when she is in her Full: And the *Eclipses* of the *Sun*, only when the *Moon* is in Conjunction with him, that is, being interposed betwixt him and the *Earth*; but the *Sun* being so much bigger there can't be a total *Eclipse*, as there may be of the *Moon*, which is less than the *Earth*.

To find the Distances and Magnitudes of the STARS, *and their swift Motions proper for them.*

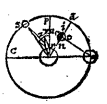
WE will instance in the *Moon*, whose distance may be thus found: First, Find the *Moons* Elevation above the *Horizon* by the help of an *Astronomical Quadrant*; as suppose 30 *Degrees*; then according to this *Figure* conclude the *Arch e, d*, will be 60 *Degrees*: Then to go on to find the quantity of the *Triangle* from the quantity of the *Arch d, e*, judge the *Angle c*, to be 60 *Degrees*; also the quantity of the *Arch h, f*, and consequently of its opposite *Angle* being known, conclude the quantity of the internal *Angle e, a, c*; which for Example, if it be found to be 100 *Degrees*, there will remain 20 *Degrees* for the *Angle e*. Upon this foundation suppose *e, a*, the *Diameter* of the *Earth* to be 1718 *Leagues*, then from the *Precepts* of *Trigonometria* proceed thus: If the *Sign* of the *Angle e*, being 20 *Degrees*, gives 1718 *Leagues* for the Side *a, c*, opposite to it; how many will the Sign of the *Angle c*, give for the Side *a, e*, which is the distance of the *Moon* from the Superficies of the *Earth*, to which the Semidiameter of the *Earth* is to be added to gain the distance from the *Center* of the World?

But this is the more common Method of finding the distance of any *Planet*, which by the help of the *Parallaxis* is performed as followeth, according to this *Figure*. Let the lesser *Circle h, g*, be for the *Globe* of the *Earth*, whose *Semidiameter* is *b, a*; then supposing *l*, to be the *Planet*, let *m*, the true place of the said *Planet* in the *Firmament l, m, e*, be Elevated above the *Horizon* 40 *Degrees*; but let *l*, the *Suns* apparent place, be Elevated only 30 *Degrees*. Then the *Parallaxis* will be only 10 *Degrees*, and consequently the *Angle* opposite to the Arch *l, m*, will be 10 *Degrees*. Therefore so much likewise must the *Angle* be, which is opposite to it at the *Vertex* within the *Triangle* *b, i, a*, whereof *b, a*, is known to be 1718 *Leagues*.



Moreover the *Angle a*, becomes known from the *Arch* in *e*, which must of necessity be 50 *Degrees*, from this *Hypothesis*, that the Elevation of the place *m*, was 40 *Degrees*. These things thus laid down, it may be thence inferr'd; If the *Parallelick Angle i*, or rather the Sign of the *Angle i*, being 10 *Degrees*, gives the Side *b, a*, 1718 *Leagues*: How many will the Sign of the *Angle a*, give for the Side *b, i*, which is the distance of the *Superficies* of the *Earth*?

Much after the same Method, by the *Doctrine* of *Trigonometria* some find the *Suns Altitude* as in this *Figure*; Suppose the *Sun* to be in the *Horizon*, and the *Moon* in *i, c, o, n*, to be distant from it 87 *Degrees*; then suppose the *Line o, p*, to be perpendicularly drawn from the *Sun* to the *Moon*, constituting right *Angles* in the *Lunar Body* it self.



Hence if the *Angle* at the *Center* of the World under the *Arch, d a*, be granted to be 87 *Degrees*, it will follow that the *Angle a*, in the *Sun* will be only 3 *Degrees*; whence it may be thus concluded; As the *Angle* of the 3 *Degrees*, at the side of the *Lunar* distance from the *Center* of the World, which by the former *Problem* is taken for known; so is the *Angle a, o, b*, to the side *b a*, which is the *Suns* distance, from the *Center* of the World. Whence if we *Subtract*, the *Semidiameter* of the *Earth*, the *Suns* distance from the *Earths Superficies* will be thence known.

Secondly, From the common Observation, and Computation of *Astronomers*; The *Moons Apogæan*, (that is in its farthest distance,) is distant from the *Center* of the *Earth*, or which is the same thing, 104798 *Leagues*, which number ariseth from the Multiplication of 1718, the number of *Leagues* in the *Earths Semidiameter* by 61.

The *Moons Perigæan*, (that is its least distance from the *Earth*,) is 89336 *Leagues*.

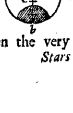
The *Suns Perigæan*, (that is its least distance from the *Earth*,) is 1101 *Semidiameters*, or 1891518 *Leagues*.

But according to the opinion of *Clavius*, the *Sun* is distant from the *Earth*, 2089088 *Leagues*.

The *Stars* of the *Firmament* are distant from the said *Centers* of the *Earth*, 14000 *Semidiameters*, or 20452000 *Leagues*.

Here we follow the common Observations of *Bourdinus*, and *Clavius*, although some there be that differ, as *Lanspergius*, &c.

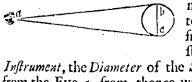
Thirdly, As to the *Magnitude* of these *Heavenly Bodies*, and the *Heavens* in which they are; it may be determined divers ways. In the first place several Arguments may be drawn to prove the *Magnitude* of the *Sun* and *Moon* from the Shadow of the *Earth*, For suppose the *Suns* Shadow cast from the *Earth* to be finite, and the Beams at length to meet, as in this *Figure*, otherwise if the said Shadow should be cast in *Infinitum*, it would not only involve the *Moon* when it suffers an *Eclipse*, but also *Mars*, *Jupiter*, and the other *Planets*, and even the very *Stars*



Stars of the *Firmament*; the contrary whereof is found by experience. Also certain it is that this Shadow of the *Earth*, becomes *Conical*, as appears by the *Moon*, when she is in the *Wain*, for then the Confine of the Shadow, is always Circular, which proceeds from no other cause, than from the round form of the said Shadow. Moreover this is certain, that the *Moon* suffers not an *Eclipse*, except so far as it falls out upon the Shadow of the *Earth*: whereupon that *Eclipse* of the *Moon*, is longest where she is less distant from the *Earth*, because that part of the *Cone* is always biggest which comes neareſt to the *Basis*. These things thus supposed; It is first to be inferr'd that the *Sun* is bigger than the *Globe* of the *Earth*, because as oft as the Shadow of the *Opac* Body is *Conical*, and the extream *Rays* at length meet, then always the *Lucid* part is bigger than the *Opac* Body, as appears by the *Figures* at the Letter *c*.

Likewise it is to be inferr'd, that the *Moon* is lesser not only than the *Sun*, but also than the *Globe* of the *Earth*, forasmuch as it is sometimes all hid within the Shadow of the *Earth*, which *Shadow* nevertheless, when as it proceeds from the *Earth* in fashion of a *Top*, or *Cone*, it always so much the more Decreases, by how much the farther it is cast from the *Earth* it self, as is manifest by the aforesaid *Figures*.

Moreover the determined *Magnitude* of those *Bodies* might be assigned from the Principles of *Geometry*, after this manner, according to this *Figure*. If from a known distance by a proper *Instrument*, the *Diameter* of the *Star b, c*, be taken from the Eye *a*, from thence will be produced the *Isosceles Triangle a, b, c*, whose *Angle a*, being known, consequently the quantity of those *Angles* will be known, which are at the Base *b, c*. Whence the *Astronomers* make this Conclusion; As the *Sign* of the *Angle b*, is to the Side, or known distance *a, c*, so is the *Angle a*, to the opposite Side *b, c*.



There is another very common and safe way of inquiring into the *Magnitude* of *Stars*, for that of the *Sun* is particular, since *Astronomers* have by certain reason and experience found, that the *Diameter* of the *Suns* Body possesseth the dimidiated, or half *Degree* of that *Circle* which it runs through in its Diurnal motion: And when by the *Suns* distance from the *Center* of the *World*, the circumference of the *Circle* is found, it will be easie by *Arithmetical Division* to find the quantity of the dimidiated *Degree*. And from thence they affirm, that the *Suns Diameter* contains five *Diameters* and an half of the *Earth*; whence also according to the Precepts of *Cyclometry*, they easily judge of its other *Magnitudes*.

Thus, whereas the *Suns Diameter* is to the *Diameter* of the *Earth*, as $5\frac{1}{2}$ to 1; and whereas the *Sphæres* are in a *Triplicate* proportion of their *Diameters*; it follows, that the *Suns* Body contains the *Magnitude* of the *Terrestrial Globe* above 166 times, when at the same time the *Moon* is 40 times less than the *Globe* of the *Earth*.

In like manner by *Geometrical Proportion*, it is found by *Astronomers* that the *Magnitudes* of other *Stars*; affirming, that those *Stars* of the *Firmament*, which are said to be of the first Magnitude, are 107 times bigger than the *Globe* of the *Earth*; and that those which are said to be of the sixth Magnitude exceed the said *Globe* of the *Earth* 18 times, or thereabouts.

Note, that the Duplicate distance of any *Star* from the *Center* of the *Earth*, makes the whole *Diameter* of the *Heaven*, or of that *Circle* which the *Star* runs through in its Diurnal motion. Thus the *Diameter* thereof being known, the Circumference is easily found by the *Rule* of *Three*. So that,

Fourthly, The *Circle* of the *Moons Perigæan* is 561540 *Leagues*, of the *Moons Apogæan* 658730 *Leagues*.

The *Compass* of the *Suns Perigæan* is 11889541 *Leagues*, of the *Suns Apogæan* 13131410 *Leagues*.

The *Compass* of the *Firmament*, as to its greater *Circles*; for Example, the *Æquator* is 151184000 *Leagues*, from which Number (according to the *Precepts* of *Geometry*) may be collected the *Concave Superficies* of the *Firmament*, or Capacity of the whole *World*; and this Capacity however thus stupendiously great, if filled up with little *Sands*, the number thereof will yet not consist of above 50 *Figures*, as according to *Archimedes* may be easily made out by the triple *Rule* of *Proportion*, which is the proper Subject of *Geometry*.

The Substance and Motion of the Stars.

PHilosophers are of Opinion, that the *Stars* are of the same Substance with the *Heavens*, in which they are, yet differ as to their thickness of Body, being thereby capable to receive and retain their borrowed Light of the *Sun*, and by that means become visible unto us in the Nights, when the Light of the *Sun* is departed from our *Horizon*.

These *fixed Stars* have no other Motion than the *Heaven* in which they are placed; yet sometimes seem nearer the *Meridian* than at other times, and the reason is, because of the several Motions of the *Firmament*, in which they are placed. But the *Planets* change their place; yet not by their own Motions, but only through the Motion of the *Heaven*, in which they are fixed.

Of the Cœlestial Motions, and their various Affections.

WE come to treat of the various Aspects of the *Stars*, and of their *swiftness* in Motion, and of their *rising* and *setting*.

These *Aspects* are certain Habitudes, or Dispositions of the *Planets* under the *Zodiack*, from whence certain particular Effects in nature are

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produc'd; the principal of these *Aspects* are five, which this *Figure* represents.

The first is the *Synodos*, or *Conjunction*; that is, when two *Planets* are both under some Degree of the *Zodiack*.

The second is the *Hexagon*, *Sextile*, or *Sexangular Aspect*; that is to say, when two *Planets* are distant from each other a sixth part of the *Zodiack*, or two *Dodecatemories*.

The third is a *Tetragon*, *Quadrat*, or *Quadrangular Aspect*, that is, when they are distant from each other three *Dodecatemories*.

The fourth is a *Trigon*, or *Triangular Aspect*, when they are distant four *Dodecatemories*.

The fifth and last is *Opposition*, or a *Diametrical Aspect*; that is, when they are distant from one another six *Dodecatemories*, being the Interval of six *Signs*.

Note, that a *Planet* is said to be Exalted when it is in that *Sign* with which it exerciseth its greatest vertue; to which Exaltation of a *Planet*, is oppos'ed its debility, that is, when it is in that *Sign* with which it exerciseth its least vertue.

Now as to the *swiftness* of the *Cœlestial Motions*; The slower Motion is that by which the *Stars* are moved from West to East, contrary to the rapid *Motion* of the *Primum Mobile*, as the Ancients term it. And thus the *Stars* of the *Firmament* are moved according to the order of the *Signs* under the *Zodiack* of the *Primum Mobile*, that they do not finish their Period till after the expiration of about 28800 Years, which course of time is by some called the *Platonick Year*.

Now as to the *Planets*, or *Wandring Stars*: The *Sun* runs through the *Zodiack* in 365 *Days*, 5 *Hours*, and 48 *Minutes*. Whence we may note.

First, That the *Sun* daily advances under the *Ecliptick* about one *Degree*; and that hereupon he marks out new Points in the *Horizon*, both rising and setting; and that he thus moves gradually from one *Tropick* to the other by *Spiral Lines*, and by *Circles* which they call *Parallels*, such as are described in these *Figures*. And of these *Parallels*, some are Northern, and some Southern, which taking their beginning from the *Æquator*, begin also to be numbred from thence.

Secondly, That the *Sun* spends 87 *Days* in passing through the Northern *Signs*, and then becomes *Apogæan*; whereas in the Southern he is *Perigæan*, in which he stays not above 178 *Days*.

Thirdly, That the *Sun* thus ascending and descending from one *Solstice* to another, describes about 182 *Parallels*, according to the number of *Days* in which he runs that Course. And although these *Parallels* are not altogether *Circles*, but *Sphæres*, yet because there is no sensible error in them, they are wont nevertheless to be called *Circles*, and amongst them the *Tropicks* and *Æquator* are numbred.

Fourthly, That the *Suns Apogæum* is found to be about the 7*th Degree* of *Cancer*, whence it advances by little and little towards the following *Signs*, and that after this manner it runs through the whole *Zodiack* in the space of about 21000 Years. And this is collected from thence, that in the time of *Hipparchus* it was about the 5*th Degree* of *Gemini*. Observing therefore the proportion of time in which it hath advanc'd so many *Degrees*, it is easie to conclude how much it proceeds further almost every Year.

Fifthly, That the *Moon* finishes her Course through the *Zodiack* in 27 *Days*, 7 *Hours*, and 43 *Minutes*; so that vulgarly the Course of the *Moon* each Day is computed to be 13 *Degrees*, and some odd *Minutes*; in which Course there are to be observed in the *Moon* (both Increasing and Decreasing) several *Phases*. On the first Day, which is her *Congress*, or *Conjunction* with the *Sun*, she is void of Light, and is therefore called *Luna silens*, and is then in her *Apogæum*. On the fourth Day, having a *Sextile Aspect* in a middle *Longitude*, she becomes *Corniculate*, or *Horned*. On the 7*th* Day, being in her *Perigæum*, or *Quadrat Aspect*, she is called *Dividua*, or *Half-Moon*. On the 11*th* Day she is in her *Trine Aspect*, and repeats her middle *Longitude*, being on either side *Gibbous*. On the 15*th* Day she becomes again *Apogæan*, and is in her *Diametrical Aspect*, which is commonly termed *Opposition*; and this makes the *Plenilunium*, or *Full Moon*: From which *Full Moon*, going back she repeats the same *Aspects* in a Retrograde order, turning her *Horns* towards the West, and appearing in the Morning; whereas on the contrary Increasing, she was visible in the Evening, and turn'd her *Horns* Eastwards; for the Illuminated part of the *Moon* is always towards the *Sun*, as is to be seen by this *Figure*.

The Swiftness of the *Diurnal Motion* is more or less, according to the Magnitude of the *Circle* made by this or that *Stars* Motion; and the computation of this Velocity is made by dividing the number of *Leagues* contained in the said Circuit by 24; for the *Quotient* will shew how many *Leagues* are hourly finish'd: As for Example, According to the above-mentioned computation of the intire Circuits, the *Moon* in her *Perigæum* hourly finishes about 23230 *Leagues*, in her *Apogæan* about 27447.

So the *Sun* in his least distance from the *Earth* dispatches about 494564; in his *Apogæum*, or greatest distance, about 547142 in an Hour.

So likewise the *Stars* of the *Firmament*, towards the *Æquator*, compass in one Hour about 6299333 *Leagues*, and in one Minute above 104988; that is, generally about such and such Numbers, omitting those *Fractions* allowed to belong to all, or most of them.

It is to be understood, that all *Astronomers* do not consent in these Measures, partly because the Measure of a *League* is different in several parts of the *World*, and some Measure by *Miles*, which also differ; to which may be added the Errors possible to be made through Ignorance, however the *Principles* upon which Skilful *Astronomers* build their Operations, agree in the main.

Seventhly, The beginning and end of *Cœlestial Motion* above the *Horizon*, is called Rising and Setting; for the *Sun* (when it ascends above the *Horizon*) is said to rise to all that live in the *Hemisphære* above; on the contrary, when it sinks beneath the *Horizon* it is said to be set.

Now *Ortive*, and *Occasive Latitude*, is the distance of that *Horizontal Point* in which on any Day fought, the *Sun* Rises or Sets from the *Æquinoctial Point*, in which the *Horizon* is cut by the *Æquator*.

The Rising or Setting of any of the *Signs* of the *Zodiack*, is properly called by *Astronomers*, *Ascent*, or *Descent*. The *Ascent*, or *Ascension* of any *Sign*, is some part of the *Æquinoctial Circle*, or *Æquator*, reckoned from the beginning of *Aries*, which ascends above the *Horizon*, together with a certain *Arch* of the *Zodiack*, or *Ecliptick*, which (in respect of the parts of the *Zodiack*) is either *Right Ascension*, that is, when more *Degrees* arise from the *Æquator* than from the *Ecliptick*; or *Oblique*, that is, when fewer *Degrees* arise from the *Æquator* than from the *Ecliptick*; and so proportionably of the *Right*, and *Oblique Descension*.

Besides this *Astronomical Rising* and *Setting* of the *Sun*, and other *Stars* here treated of, there is another sort, which being much used by the *Poets* is therefore called the *Poetical Rising* and *Setting*, and this is threefold; *viz.* First, *Cosmical*; that is, when any *Sign* of the *Zodiack* riseth with the *Sun*. Secondly, *Chronical*; that is, when a *Star* riseth at the time of the *Suns* setting, when as *Cosmical* and *Chronical* Setting are quite contrary. Thirdly, *Heliacal*, Rising or Setting; for a *Star* riseth *Heliacally* when it becomes conspicuous at the *Suns setting*, which could not before, by reason of the brightness of the *Suns Beams*; and sets *Heliacally*, when being visible before, it becomes obscure by the Beams of the *Rising Sun*.

Of the Principal Stars, and into how many Constellations they are divided.

As *Stronomers* do take notice of 1377 *Stars*, of which said number (according to *Tycho* and other Ancient *Astronomers*) 1241 appear in our *Horizon*, and 136 about the *South Pole*. The knowledge of which said *Stars* were found out by certain proper *Instruments* made for the taking their *Latitude* and *Longitude*.

These *Stars* were afterwards reduced into *Constellations* by the *Egyptians*, alloting such a number of *Stars* together as best represented the Thing, or *Image* they appropriated to it. Of these *Constellations* there are 62, of which 12 are the *Signs* of the *Zodiack*, 27 more in the South *Hemisphære*, and 23 in the North.

The Names of the *Constellations* are as followeth, as they are taken notice of by Sir *Jonas Moore*, deceased; and first with those in the *Zodiack*, which are 12, *viz.*

ARIES, which contains 19 *Stars*, of which the most noted is that in his *Ear*, being of the third Magnitude.

TAURUS, which contains 48 *Stars*, one of which is in the *Eye*, being of the first Magnitude, and called *Aldebaran*; another in the tip of his *Horn*, being of the second Magnitude; and this great *Constellation* hath two smaller belonging to it, the first the *Plejades*, or *Seven Stars*, being in his *Neck*; and the second called *Hyades*, being Five *Stars* near his *Eye*.

GEMINI, which contains 34 *Stars*, of which three are of the second Magnitude, one in the *Head*, called *Castor*, another in the *Neck*, called *Pollux*, and the third in the *Foot*.

CANCER contains 32 *Stars*, two being of the third Magnitude, the rest of the fourth, fifth, and sixth.

LEO, containing 43 *Stars*, two of which are of the first Magnitude, *viz. Regulus*, or the *Lions Heart*, and *Cauda-Leonis* in the *Tail*; also two of the second Magnitude, *viz.* one on the top of his *Loins*, and another in the middle of the three in his *Neck*.

VIRGO, which contains 45 *Stars*, one of which is of the first Magnitude in her Left hand, called *Spica Virginis*.

LIBRA, which contains 14 *Stars*, of which two are of the second Magnitude, the one in the end of the Handle, called *Lanx Septentrionalis*, and the other in the *Southern Scale*, called *Lanx Meridionalis*.

SCORPIO contains 35 *Stars*, one of which is of the first Magnitude, being in the Body, and called *Cor Scorpionis*.

SAGITTARIUS contains 30 *Stars*, two of which are of the second Magnitude, the one in the *Knee*, and the other in the *Heel* of the right Leg.

CAPRICORNUS contains 28 *Stars*, but none of the first or second Magnitude.

AQUARIUS contains 42 *Stars*, but none likewise of any considerable Magnitude. And,

PISCES, contains 36 *Stars*, but none of the first or second Magnitude.

The

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The Constellations *on the South side of the Zodiack, are*

ORION, A signal *Constellation* of 56 *Stars*, one of which is of the first Magnitude in his left *Shoulder*, and another in his right *Foot* also of the said Magnitude, called *Rigel*; also four of the second Magnitude, of which one in his *Shoulder*, and three in his *Girdle*, called the *Yard-wand*; there are also two others in his *Shoulders*, two in his *Feet*, three in his *Yard-wand*, and three in the *Sword*.

CETUS, or the *Whale*, contain 29 *Stars*, two of which are of the second Magnitude, the one near his *Mouth*, and the other near his *Tail*.

ERIDANUS, or the *River*, contains 44 *Stars*, one of which is of the first Magnitude, called *Enar*; the rest are all small.

CANIS MAJOR, or the *Great Dog*, contains 19 *Stars*, one of which is of the first Magnitude, being in his *Mouth*, and called *Sirius*; also one of the second Magnitude near his left *Knee*; the rest are small ones.

CANIS MINOR, or the *Little Dog*, hath 10 *Stars*, one of which is in his *Belly*, called *Procyon*, and of the first Magnitude; the rest are small.

LEPUS, or the *Hare*, contains 13 small *Stars*.

ARGO NAVIS, or the *Ship*, hath 51 *Stars*, one of which being in the *Rudder*, called *Canopus*, is of the first Magnitude; also seven *Stars* of the second Magnitude up and down in it.

CRATER, the *Goblet*, a small *Constellation* of 11 *Stars*.

CENTAURUS contains 41 *Stars*, two of which are of the first Magnitude, the one in his left *Thigh*, and the other in the extremity of his right *Foot*.

HYDRA, or the *Serpent*, contains 29 *Stars*, one of which of the first Magnitude, called *Alphard*, being in the third Wreath, and sometimes called *Cor Hydræ*.

CORVUS, a small *Constellation* of 8 little *Stars*.

LUPUS, a *Constellation* of 20 small *Stars*.

The ALTAR, or a *Constellation* of 6 small *Stars*.

The SOUTHERN FISH, a *Constellation* of 12 *Stars*, of which one is of the first Magnitude; the rest all small.

The SOUTHERN CROWN, a *Constellation* of 13 small *Stars*.

There are also 12 *Constellations* more towards the *South Pole*, as *Piscis volans*, the *Peacock*, *Indus*, *Hydras*, *Triangulum*, *Chamelion*, *Toucan*, *Apis*, *Apis Indica*, *Gros*, *Dorada*, and *Phœnix*.

The Constellations *on the North side of the Zodiack; are*

THE GREAT BEAR, or *Ursa Major*, contains 35 *Stars*, of which 7 are of the second Magnitude, 3 of the third, 12 of the fourth, 8 of the fifth, and 5 of the sixth. Of the 4 that make up the *Wain*, that in his *Shoulder* is called *Dubbe*, and the *Thill-Horse*, *Alioth*, between which and the *Pole-Star* lieth the *Pole*.

The LESSER BEAR, or *Ursa Minor*, contains 10 *Stars*, of which two are of the second Magnitude, three of the fourth, one of the fifth, and three of the sixth. This *Constellation* is next the *Pole*, and therefore called the *Pole-Star*; as also the *Sea-Star*, as being of great use to *Mariners*. In this *Constellation*, as also in that of the *Great Bear* there is a *Wain*, called *Charles's Wain*, each composed of 7 *Stars*, 4 of which are for the *Wain*, and 3 for the *Horses*, the brightest in the *Wain* being called by *Sea-men*, the brightest of the *Guards*.

DRACO, or the *Dragon*, contains 35 *Stars*, lying betwixt the two *Bears*, and noted for that it hath *Stars* in every one of the 12 *Signs*, as also by reason the *Pole* of the *Ecliptick* lieth in the midst of this *Constellation*:

ANDROMEDA, or the *Chained Woman*, freed and married to *Perseus*, contains 27 *Stars*, of which three are of the second Magnitude, one in her *Head*, another in her *Leg*, and the third in her *Girdle*.

CASSIOPEA, the Mother of *Andromeda* sitting in her Chair, contains 28 *Stars*, the principal of which is in her *Breast*, being a bright *Star* of the third Magnitude, and called *Scheder*.

PERSEUS, the Son of *Danae*, who cleared *Andromeda*, and brought away *Medusa's Head*. It contains 42 *Stars*, of which two are of the second Magnitude, the one in his left *Side*, called *Algenib*; and the other in *Medusa's Head*, called *Algol*.

CEPHUS, an *Ethiopian* King, contains 21 *Stars*, but none of any considerable Magnitude.

HERCULES *with his Club*, watching the *Dragon*, contains 62 *Stars*, of which 9 are of the third Magnitude, amongst which that in his *Head*, called *Ras Algethi* is of chiefest note.

AURIGA, the *Carter*, contains 40 *Stars*, of which one is in his *Back* of the first Magnitude, called the *Goat Star*, *Hircus*, and *Capella*.

BOOTES, the Keeper of the *Bear*, contains 32 *Stars*, of which one is of the first Magnitude betwixt his *Legs*, called *Arcturus*, being a noted *Star*.

SERPENTARIUS, that holds the *Serpent*, contains 30 *Stars*, of which one is in his *Head*, of the second Magnitude.

PEGASUS, or the *Winged Horse*, contains 23 *Stars*, of which four are of the second Magnitude, and that in the Tip of the *Wing* is called *Markab*; these four *Stars* make a Square.

The NORTHERN CROWN, or *Ariadne's Crown*, contains 21 *Stars*, of which one is of the second Magnitude, called the *bright Star* in the *Crown*.

The SERPENT contains 35 *Stars*, of which one is in his *Neck*, being of the second Magnitude.

The HARP, or *Vultur Cadens*, contains 15 *Stars*, of which one is of the first Magnitude, called *Lucida-Lyra*, or the *bright Star* in the *Harp*.

SAGITTA, or the *Dart*, contains 8 *Stars*, none of any considerable bigness.

The SWAN contains 40 *Stars*, of which one is of the second Magnitude near the *Tail*.

The LESSER HORSE contains 4 *Stars* of the second Magnitude.

The EAGLE, or *Flying Vulture*, contains 27 *Stars*, of which one is of the second Magnitude in its *Neck*, called *Aquila*, or *Vultur volans*.

The TRIANGLE contains 6 small *Stars*.

The DOLPHIN contains 10 small *Stars*.

BERENICE'S HAIR contains 13 small *Stars*.

COR CAROLI, a small *Constellation* of three *Stars*, newly discovered by Sir *Charles Scarborough*, and so called in memory of King *Charles* the First.

Besides these *Constellations* aforesaid, there is the *Milky-way* fit to be taken notice of, described on the *Globe*; appearing to the Eye like a small *Cloud*, or *White-way*; but if viewed with a good long *Telescope*, are found to be an infinite number of small *Stars* close set together.

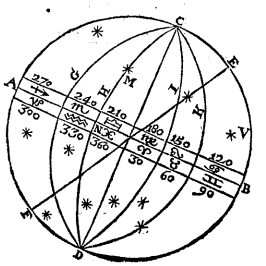
The Magnitude of the STARS, *with their Proportions to the Earth.*

THE Magnitude of the *Stars* appears by comparing the one with the other; for those of the first *Magnitude* are most considerable, and give a greater Light than those of the second, and those of the second more than those of the third, and so on.

The Magnitude of the *Stars* compared to that of the *Earth* bears this proportion; Those of the first *Magnitude* are 107 times greater than the *Earth*, those of the second 90, those of the third 72, those of the fourth 54, those of the fifth 36, and those of the sixth 18 times bigger than the *Earth*.

To find the Latitude of the fixed Stars.

THE *Latitude* of the *Stars*, is the distance of any *Star* from the *Ecliptick*, so that those *Stars* that are distant from it Northernly have North *Latitude*; and those that are Southernly, or betwixt the *South Pole* and the *Ecliptick*, have South *Latitude*, according to this *Figure*.



A B, is the *Ecliptick*.
C D, the *Poles* of the *Ecliptick*.
E F, the *Poles* of the *World*.
C A D, *C G D*, *C H D*, *C I D*, *C K D*, and *C L D*, are the six *Circles* of *Position*, that divide the *Firmament* into 12 equal parts; by which it is known under what *Sign* any *Star* is situated; for the *Circles* of *Position* pass through the beginning of every *Sign*, according to the *Figure*.

The *Latitude* of a *Star* is reckoned from the *Ecliptick* towards either of the *Poles*, so as the Arch *M N*, is the *Latitude* of the *Star* at *M*. The *Longitude* of a *Star* is to be reckoned in the *Ecliptick*, from the first point of *Aries* to the *Star*, according to the Succession of the *Signs*, *viz.* from *Aries* to *Taurus*, and so forwards.

The Longitude of the Stars.

THE *Longitude* of the *Stars*, is the distance of any *Star* from the *Vernal Equinox*, or first Point or beginning of *Aries*, and so forwards: Or to define it otherwise, It is an *Arch* of the *Ecliptick*, comprehended between the first Point of *Aries* and the *Circle* that passes through the Body of the *Stars* and *Poles* of the *Zodiack*, as appears by the aforegoing *Figure*.

The Declination of the Stars.

THIS is the same as the Declination of the *Sun*, *viz.* the distance of any *Star* from the *Æquinoctial*, as well Southwards or Northwards.

The *Stars* change in *Declination* as well as in *Longitude*, so that the newest *Tables* should be made use of.

The Right Ascension of the Sun *and* Stars, *also the Oblique Ascension, and Ascentional differerence.*

THE *Right Ascension*, is the *Point*, or *Degree* and *Minute* of the *Æquinoctial*, which comes with the *Sun* or *Star* to the *Horizon*, and that riseth or goeth down with it in a right *Sphære*.

The *Oblique Ascension*, is the *Point* or *Degree* of the *Æquinoctial*, that riseth or goeth down with the Center of the *Sun*, or *Star* in an *Oblique Sphære*.

The *Ascential Difference*, is the difference betwixt the *Right* and *Oblique Ascension*; that is to say, the number of *Degrees* contained betwixt the Point of the *Æquinoctial*, that riseth with the *Center* of the *Sun* or *Star*; and that Point of the *Æquinoctial* that comes to the *Meridian*, with the *Center* of the *Sun*, or same *Star*.

To find the Suns *place in the Zodiack.*

THE true place of the *Sun*, or any other *Planet*, is that *Sign*, or *Degree* of the *Sign*, to which it answers in a direct *Line*, which is drawn directly from the *Center* of the *World* through the *Center* of the said *Planet* to the *Zodiack*, or *Ecliptick*.

Now to find out the true place of any *Planet*; As for Example, of the *Sun*; first, the Motion of

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the *Longitude* is to be considered, whose beginning is drawn from the *Vernal Æquinoctial* of the *Primum Mobile*. Next, regard is to be had of that motion of *Longitude*, by which the *Sun* makes his Progress from his *Apogæum* to the following *Signs*; for then from the fore-mentioned motion of *Longitude* is subtracted the *Arch* of that Interval, which is the distance of the *Apogæum* from the *Æquinoctial*, and the Remainder is called the *Suns Anomaly*; which being digested into *Astronomical Tables*, declares the *Prostaphæresis* to be subtracted from the middle motion of *Longitude*, so long as the *Sun* converses in that *Hemisphære*, which is extended from the *Apogæum* to the *Perigæum*: But when he is conversant in the opposite *Hemisphære* by repeating the *Apogæum*, then it is to be added to the middle Motion, to find the true place of the *Sun*.

Besides this, there is another more common way for the readly finding the *Suns* place. First, remember what are the *Signs* proper to every *Month*, although the *Sun* enters not into the said *Signs* till towards the latter end of the said *Months*; for except *Pisces* (which he enters on the 19*th* of *February*) he enters into none of the rest until after the 20*th* Day.

These things thus premised, the *Problem* is thus resolved: Number the *Degrees* of the *Ecliptick* according to the Day given from the time of the *Sun's* Ingress into such a *Sign*, and you will come so near the matter that there will be hardly one Days difference.

To find the Sun's *Declination for any Day given.*

SEek the *Sun's* place in the *Zodiack* according to the preceding *Problem*; then apply that Part, or *Degree* of the *Ecliptick* to the *Meridian*, and reckon the *Degrees* of that *Arch*, which extends from the *Æquator* to the part of the *Sun* assigned, and the *Problem* is resolved.

There is also another more common way of finding the *Sun's Declination*, which is as follows: The *Altitude* of the *Æquator* being known when the *Meridian Hour* arrives, make use of the *Astronomical Quadrant*, directing its *Dioptra* towards the *Sun*; If it points at an equal *Degree* with the *Æquators Declination*, 'tis to be concluded that it declines not from the *Æquator*. If it makes more *Degrees*, as in the *Summer*, or fewer, as in the *Winter*, that difference is the very *Degree* of the *Sun's Declination*. For Example, On the 22*th* of *June* (in any *City* where the *Æquator* is Elevated 42 *Degrees*) I find in the *Instrument* the *Suns Meridian Elevation* to be 65 ½ *Degrees*; hence it is to be concluded, that the *Sun* then declines 23 ½ *Degrees*, which is the difference between 65 ½ *Degrees*, and 42, and so proportionally of the rest. But for the more ready finding out the *Sun's Declination* in any *Degree* of any *Sign* whatsoever, these following *Tables* are inserted. In the first *Column* whereof the *Degrees* of the *Signs* are only set down; in the rest over against it are mark'd the *Degrees* and *Minutes* of the *Sun's Declination* for each *Degree* of the *Signs*.

The Knowledge of the *Sun's Declination* is highly necessary in many respects, particularly in the making of *Dials*, and describing the *Arches* of the *Signs*, and determining of the *Altitude* of the *Pole*; where every Day at *Noon* it useth to be sought from that place which the *Sun* obtains in the *Zodiack*, and is of great use also in *Navigation*.

A Table of the Sun's *Declination.*

Signs of the Degrees.	In *Aries*, & *Libra*.		In *Taurus*, & *Scorpio*.		In *Gemini*, & *Sagittarius*.	
	Deg.	Min.	Deg.	Min.	Deg.	Min.
1	0	0	11	30	20	12
0	0	24	11	52	20	25
2	0	48	12	12	20	37
3	1	12	12	33	20	48
4	1	36	12	53	21	0
5	2	0	13	13	21	11
6	2	23	13	33	21	22
7	2	47	13	53	21	32
8	3	11	14	13	21	42
9	3	35	14	32	21	51
10	3	58	14	52	22	0
11	4	22	15	10	22	9
12	4	45	15	28	22	17
13	5	9	15	47	22	25
14	5	32	16	5	22	32
15	5	55	16	33	22	39
16	6	19	16	40	22	46
17	6	42	16	50	22	52
18	7	5	17	14	22	57
19	7	28	17	31	23	3
20	7	50	17	47	23	8
21	8	13	18	3	23	12
22	8	35	18	19	23	15
23	8	58	18	34	23	19
24	9	20	18	49	23	22
25	9	41	19	4	23	24
26	10	4	19	18	23	26
27	10	26	19	32	23	28
28	10	47	19	46	23	29
29	11	9	19	59	23	30
30	11	30	20	12	23	30

Another Table of the Sun's *Declination.*

Signs of the Degrees.	In *Cancer*, & *Capricorn.*		In *Leo*, and *Aquarius.*		In *Virgo*, & *Pisces.*	
	Deg.	Min.	Deg.	Min.	Deg.	Min.
0	23	30	20	12	11	30
1	23	30	19	59	11	19
2	23	29	19	48	10	47
3	23	28	19	32	10	26
4	23	26	19	18	10	14
5	23	24	19	49	42	42
6	23	22	18	49	9	20
7	23	19	18	34	8	58
8	23	15	18	18	8	35
9	23	12	18	38	8	13
10	23	8	17	47	7	50
11	23	3	17	31	7	28
12	22	57	17	14	7	5
13	22	52	16	57	6	42
14	22	46	16	40	6	19
15	22	39	16	33	5	55
16	22	32	16	5	5	32
17	22	25	15	47	5	9
18	22	17	15	28	4	45
19	22	9	15	10	4	22
20	22	0	14	51	3	58
21	21	51	14	32	3	35
22	21	42	14	13	3	11
23	21	32	13	53	2	47
24	21	22	13	33	2	23
25	21	11	13	12	2	0
26	21	0	12	52	1	36
27	20	49	12	32	1	12
28	20	37	12	12	0	48
29	20	25	11	51	0	24
30	20	12	11	30	0	0

To find out the Altitude or Elevation of the Sun, *or any other* Star *every Hour.*

USe either the *Astronomical Quadrant*, or the *Astrolabe* rightly disposed. Direct the *Dioptra* towards the Object, or receive through its Pins the *Radius*; then you will see how many *Degrees* the *Dioptra* cuts, by reckoning them from the *Horizontal side*.

Note, first, That the greatest *Elevation* or *Altitude* of the *Sun*, or any *Star* is *Meridian*, that is, when it comes to the *Meridian*, or Mid-*Circles* of *Heaven*. Secondly, That the *Altitude* of the said *Star* is either greater or lesser, according as it is in that part of the *Meridian*, which is more or less distant from the *Horizon*. But for the finding out this *Meridian Altitude* of the *Sun*, or *Stars*, let the *Meridian Line* be rightly drawn in any *Horizontal Plain*, by the help whereof the *Meridian Constellation* may exactly be found. Then near that *Meridian Line*, the Back of the *Astrolabe*, or any other fit Instrument of that kind being applied, the *Albidad* will point out the *Degree* of *Elevation* above the *Horizon*; and this will be the *Magnitude* of that *Arch* which extends from the place of the *Star* to the *Horizon*.

To set forth the Face of Heaven, and what Stars are above the Horizon, and what part of Heaven each of those Stars possesseth.

MAke use of the *Astrolabe*, and apply the *Degree* of the *Ecliptick* in which the *Sun* is upon the *Almucantarath*, or Circle of *Elevation* agreeing to the *Altitude*, which answers to the given Hour; then it will appear what *Constellation* is *East*, and what *West*.

Note, That the *Degree*, or *Sign*, and part of the *Zodiack* which is then found at the *Horizon*, is called by *Calculators of Nativities*, The *Ascendant Degree*, the *Angle* of the *Orient*, and the *Horoscope*: The part opposite to it is called the *Angle Occident*: That part of the *Meridian Line* is called the *Angle* at the Mid-*Heaven*. Lastly, The part opposite to it is the *Angle* of the *Earth*, or the *Degree* of *Midnight*. These four parts of the World *Astrologers* call the four *Angles* of *Heaven*.

To find the Altitude, or Elevation of the Æquator above the Horizon.

AS it is to be supposed, that they only have the *Æquator* Direct, or Right, who live under it, and have the *Poles* of the World at the *Horizon*. But it inclines, and becomes Oblique to us in such a proportion, as we recede from it, so that if we were distant from it; for Example, 40 *Degrees*, so much of *Obliquity*, or *Inclination* it hath towards the *Horizon*; but so many *Degrees* as it is distant in *Obliquity*, or *Inclination* from the *Horizon*, so much it is said to be Elevated above it.

Now what, and how great this *Elevation* is at any set time, is the Question at present, and it may be commodiously determin'd upon *Æquinoctial Days*, if at the very Hour of *Noon* the *Instrument* being disposed to the *Meridian Line*, you receive through the little Sights the Rays of the *Sun* then in the *Æquator*; for the *Dioptra*, according to the *Line* of Direction, will mark out the *Degree* of that Elevation, by numbring from the side of the *Instrument*. In brief, It is in effect but the same thing, as the finding the *Sun's Meridian Altitude* in the time of the *Equinox*.

Moreover in the time of *Summer*, or *Winter Solstice* the way of this Invention is very facil, and obvious; for the *Suns Declination* being known to be 23 *Degrees* and an half, it is but subtracting them from the *Degrees* of the *Summer Solstice* and the Question is resolved; for Example, On the 22 of *June*, at the *hour* of *Noon*, the *Sun* being in the *Tropick* of *Cancer*, or in the first *Degree*, of that *Sign*, gives in the *Instrument* 64 *Degrees* and 30 *Minutes* of *Elevation*; from which 23 *Degrees* and 30 *Minutes* being subtracted, there will remain 41 *Degrees*, the *Altitude* of the *Æquator* in the said *City*.

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To find the Distance of the Vertical Point from the Æquator.

THe *Æquators Elevation* being found, the Complement thereof to 90 *Degrees* gives the sought distance: For Example; If in the said *City*, the *Altitude* of the *Æquator* be 40 ½ *Degrees*, it will follow that the *Vertical* is distant from the *Æquator* 49 ½ *Degrees*.

To find the Poles Altitude.

THis is very Easy to be done, from what hath been said, for the *Suns Meridian Altitude* in either of the *Æquinoxes* being granted, you have consequently the distance of the *Vertical Point* from the *Æquator*, and the *Meridian Latitude*. And this distance, and *Latitude* is equal (as hath been said) to the Elevation of the *Pole*; or otherwise, is equal to the *Arch* of the *Meridian* plac'd between the *Elevated Pole* of the *World*, and the *Horizon*; so that to have the *Altitude* of the *Pole*, the *Suns Meridian Altitude* is to be sought either by adding or substracting the *Degrees* of *Declination*, if it be at the time of either of the *Æquinoxes*.

But this is to be noted, that this way the *Altitude* of the *Pole* is only indirectly found, neither can it be directly had in it self, since no *Star* is visible to us at those Points of *Heaven*, which are called the *Poles*: so that *Geographers* use to apply themselves to those *Stars* that are nearest the *Pole*, especially to that which is called the *Pole Star* to judge thereof; And thus they proceed, In the first place, the *Meridian Altitude* of that *Star* is sought when it arives at the *Meridian Circle*; Secondly, 12 hours after when it comes to the opposite part of the *Meridian*, then its *Altitude* being sought again, the difference of those *Meridian Altitudes* is to be considered, which done, the half of the difference found is to be added to the lesser *Meridian Altitude* to find the *Poles Altitude*; For Example, If one of the *Stars* nearest the *Pole* be found in its highest *Meridian Altitude* to be 60 *Degeres*, and in its lowest only 40, the Difference of these *Altitudes* is 20, and the half of that number 10, which added to 40 makes 50, whence we infer that the *Pole* is then Elevated 50 *Degrees*.

To find the Longitude.

THis is a troublesome thing and cannot be very exactly performed, the best way is by *Lunar Eclipses*, for we must suppose the distance of *Longitude*; for Example, Between one Town and another to be the distance of their proper *Meridians*. The better therefore to understand what distance of *Longitude Rome* and *Paris* have one from another, there ought to be observed both at *Rome*, and *Paris*, by able *Astronomers*, some certain part of any *Lunar Eclipse*; as perhaps the beginning, but rather the middle. Then the business is to know at what Hour this hapned at *Rome*, and at what Hour at *Paris*; for since the Ingress of the *Moon* within the shadow of the *Earth* appears at the same time throughout all the whole *Hemisphære*, and yet the Hours differ with the *Meridians*, then it being found the beginning of the *Eclipse* was at 9 of the Clock, and at *Paris* at 10. It must thence be concluded that *Paris* is distant from *Rome* the *Longitude* of 15 *Meridians*, as passing through 15 several *Degrees* of the *Æquator*, there going (as before taken notice of) 15 *Degrees* of the *Æquator* to one *Hour*.

But to Conclude, It must be understood, that the *Longitude*, and *Latitude* which is now treated of, is that which is properly called *Mundane*, or *Geographical*; for in *Astronomy*, as hath been already observed, the *Latitude* properly spoken of, is the *Latitude* of a *Star*, which is its distance from the *Ecliptick*, or the *Arch* between the *Ecliptick*, and the true place of the said *Star*: So likewise *Longitude* is the distance thereof from the beginning of *Aries*, or the *Vernal Æquinoctial Point* towards the *Signs* of *Taurus*, *Cancer*, and those that follow; or as some expres it, an *Arch* of the *Zodiack*, drawn from the beginning of *Aries* through those *Signs*.

ASTRO-

ASTROLOGY.

ASTROLOGY is the Art of fore-telling things to come, and of giving Judgment of *Human Affairs* and *Revolutions*, by the mutual *Aspects* of the *Planets*, and their disposition towards any of the *Twelve Signs* of the *Zodiack*.

The Twelve Signs are thus Named and Characterized.

♈ ♉ ♊ ♋ ♌ ♍
Aries. Taurus. Gemini. Cancer. Leo. Virgo.

♎ ♏ ♐ ♑ ♒ ♓
Libra. Scorpio. Sagittary. Capricorn. Aquarius. Pisces.

The Division, Nature, and quality of the Twelve Signs.

♈ ♌ ♐ are fiery, hot, and dry, and are therefore called the *fiery Triplicity*.

♉ ♍ ♑ are cold, dry, and earthly, and are called the *Earthly Triplicity*.

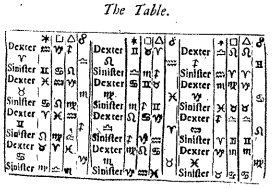
♊ ♎ ♒ are airy, hot, and moist, which make the *Airy Triplicity*.

♋ ♏ ♓ are cold, moist, and watry, and are named the *Watry Triplicity*.

The *Signs* are again divided into Moveable, Fixed, and Common; the Moveable are ♈,♋,♎,♑; the Fixed ♉,♌,♏,♒; the Common ♊,♍,♐,♓. They are called Moveable, because that when the *Sun* enters those *Signs*, the season and temperature of the Weather soon changeth; Fixed, because when the *Sun* enters them, the temper of the Air is more fixed and stable; And lastly, they are called Common, because they partake both of the preceding and consequent *Sign*.

But herein note, that the Moveable *Signs*, behold each other with □, the Fixed behold each other with □, and the Common behold each other with □. The *Fiery Signs* behold each other with △, the *Earthy Signs* behold each other with △; so likewise the *Air* and *Watry*, &c. Which this *Table* following will inform you more at large.

The Table.



The use of this *Table* is very easie, as thus; you may observe *Aries* is in *Sextile* Dexter to *Aquarius*, and *Sextile* Sinister to *Gemini*; and in *Quartile* Dexter to *Capricorn*, and *Quartile* Sinister to *Cancer*; in *Trine* Dexter to *Sagittary*, and *Trine* Sinister to *Leo*, and his *Oppofition* to *Libra*. Observe the like in the rest; where note a Planet in *Aries* beholds another Planet, if he be in the same *Signs*, with the like *Aspects*, so that they be within the half of each others Orb; as thus, a Planet in *Aries* beholds another in *Aquarius* with *Sextile* Dexter, and so of the rest.

The Names and Characters of the Planets.

♄ *Saturn.*
♃ *Jupiter.* ☉ *Sol*, or the *Sun.* ☿ *Mercury.*
♂ *Mars.* ♀ *Venus.*
☾ *Luna*, or the *Moon.*
☊ *Dragons Head.* ☋ *Dragons Tail.*

Of the Aspects.

BEsides the Five common *Aspects* mentioned in *Astronomy*, and of the general use therein, there are several others added by the most Famous *Astrologers*, as very much conducing to their *Art*, so that 'tis thought expedient to joyn this compleat *Table* of them all in general.

A Table of the Aspects.

		D.	M.
☌	*Conjunction*, in the same Sign and Degree.	S.	D.
⚺	*Semisextile*, when Planets are distant 30 Degrees, or	1	00
⚹	*Sextile*, when they are distant 60 Deg. or	2	00
⚳	*Quintile*, when distant 72 Degrees, or	2	12
□	*Quartile*, when they are distant 90 Deg. or	3	00
Td	*Tredicile*, when they be distant 108 Degrees, or	3	18
△	*Trine*, when distant 120 Degrees, or	4	00
Bq	*Biquintile*, when distant 144 Degrees, or	4	14
Vc	*Quincunx*, when they are asunder 150 Degrees, or	5	00
☍	*Opposition*, when distant 180 Degrees, or	6	00

Of the Division of the 12 Houses.

IN the next place, I think it most convenient (before I teach the young Student how to erect a Figure of *Heaven*) to shew him the division of the 12 *Houses* of *Heaven*.

The whole Sphære of *Heaven* is divided into four equal Parts by the *Meridian* and *Horizon*, and every one of these Parts or Quadrants are divided into three other Parts, according to other Circles, drawn by Points of

C 2 Secti-

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Sections of the aforesaid *Meridian* and *Horizon*; so the whole is divided into Twelve equal Parts, which the *Astrologers* call *Houses*, or *Mansions*, taking their beginning from the East.

The first Part or Quadrant is described from the *Angle* of the East to the Mid-*Heaven*, *viz.* from the Line of the first *House* to the Line of the tenth *House*, and contains the twelfth, eleventh, and tenth *Houses*. It is called the *Oriental*, *Vernal*, *Ascending*, *Masculine*, *Sanguine Infant Quarter*, verging to the South.

The second Quadrant is from the *Cusp* of the Mid-*Heaven*, to the *Cusp* of the seventh *House*, and contains the ninth, eighth, and seventh *Houses*; and is called the *Meridian*, *Estival*, *Feminine*, *Youthful*, *Cholerick Quarter*, verging to the West.

The third Quadrant, is from the *Cusp* of the seventh *House*, to the *Cusp* of the fourth *House*, and contains the sixth, fifth, and fourth *Houses*; and is called, *Occidental*, *Autumnal*, *Masculine*, *Melancholick*, *Manhood*, *Cold* and *Dry*, verging to the North.

The fourth Quadrant, is from the *Cusp* of the fourth House, or *Imum Cæli*, to the *Cusp* of the first *House*, and contains the third, second, and first *Houses*. Its called, *Northern*, *Feminine*, *Old Age*, of the Nature of *Winter*, *Phlegmatick*, verging East.

The first, tenth, seventh and fourth *Houses* are called *Angles*; the eleventh, second, eighth and fifth, *Succedents*; the third, twelfth, sixth and ninth, *Cadents*. The *Angles* most powerful, the *Succedents* next in force, the *Cadents* weak: The *Succedents* are next to the *Angles*; the *Cadents* next to the *Succedents*.

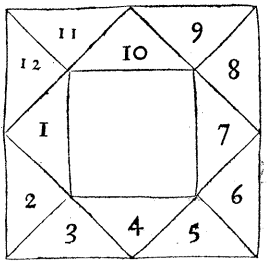
1. 10. 7. 4	11. 5. 2. 8	9. 3. 12. 6
Angles.	*Succedents.*	*Cadents.*

Note, That the first *House* is preferred before the tenth, and the tenth before the seventh, &c.

How to Erect a Figure of Heaven.

SInce I have shewed you the division of the Twelve *Houses*, it is also requisite to shew the use of them, and how to erect a Figure. First, draw the *Figure* following; and note that the Twelve empty places are the Twelve *Houses*, as the *Figures* standing on the *Cusp* or beginning of each *House* doth inform you, and the vacant place in the middle may note to you the *Earth*, which is surrounded with the *Heavens*; in which it is usual to write the Year, Month, Day, and Hour when the *Figure* was made. Thus have you a Figure of the *Heavens* and *Earth* in *plano*.

Note, Where you see the Figure 1 placed, that is called the *Cusp* of the first *House*, or *Ascendent*, the Figure 2 shews you the *Cusp* of the second *House*, and the Figure 3 the *Cusp* of the third *House*, &c. and so of the rest.



Having drawn your *Blank Figure*, then seek the place of the *Sun* in the *Ephemeris*; and having found the *Suns* place, then enter the Table of *Houses*, and in the Column of the Tenth *House*, find the Sign and Degree the *Sun* is in; and if you find not the just place of the *Sun*, then take the neareſt to it, for many times there be odd *Minutes* adhering to his place; which if the odd *Minute* be above 30, then take the next whole *Degree*; but if under 30, you may reject them, and take the even *Degree*; and right against it in the Column towards the Left hand, entituled [*Time from Noon*] you have the time in *Hours* and *Minutes* of the *Suns* right Ascensions to be added to the time of the *Hour* and *Minute* you make your Figure for; and the *Hours* and *Minutes* thus added (if they be under 24 *Hours*) seek out in the Column of *Time from Noon*; but if they exceed 24 *Hours*, then cast away 24 *Hours*, and the Remainder seek out under the Column of *Time from Noon*, and right against it in the same Line you have the *Signs*, *Degrees*, and *Minutes*, to be placed upon the 10, 11, 12. 1, 2 and 3 *Houses*, so have you six of the *Houses*, the other six are easily found only by placing the same *Degree* and *Minute* of the opposite *Sign* on the opposite *House*; if you cannot tell what *Signs* are opposite to each other, look at the beginning of the Tract, and you may see that *Aries* is opposite to *Libra*, and *Taurus* is opposite to *Scorpio*, &c. Take example by that Figure at the beginning of the *Ephemeris*, when *Sol* enters *Aries*. Next you must learn to place the *Planets* in the Figure aright, as you may see in the same Figure; as thus, you may observe, *Saturn* being more *Degrees* than the *Cusp* of the fourth, is placed in the fourth; *Jupiter* being in fewer *Degrees* than the *Cusp* of the Ascendent, is placed above the Ascendent: the like Rule observe in all the rest, &c.

Here note, That the Figure of *Sols* entring *Aries*, is erected for *London* by the Table of *Houses* of 51 *Degr.* 32 *Min.* which is the Elevation of that place; but if you chance to be in another Elevation when you make your Figure, then take that Table of *Houses* which is neareſt the Elevation you are in.

How

How to reduce the Ephemeris, *and* Suns *declination to any other Meridian.*

FOrasmuch as the *Suns* Declination is of great use, I shall first shew an Example of that: Observe this, that a Table of *Declination*, or an *Ephemeris* made for any particular place, will not serve generally for all places, but only for such places as have the like, or near the same *Longitude*. The reason is, because the *Declination* (or the *Ephemeris*) is calculated according to the true place of the *Sun* at Noon, at which time the *Sun* is upon the *Meridian* at that place for which the said Tables are made: But you must note, that the *Sun* doth not come to the *Meridian* in all places at a like time; although that in all places the *Sun* being upon the *Meridian* makes the Middle of the Day; but for every 15 *Degrees* difference of *Longitude* between any two places, the *Sun* comes sooner or later to the *Meridian* by so many Hours: So that if a place be 15 *Degrees* to the Eastward of the place prefixed, then the *Sun* comes sooner to the *Meridian* by an Hour, and if it be 15 *Degrees* to the Westward, later by an Hour, and so consequently more or less, according to the difference of *Longitude*; by which reason, in what Part of the World soever you be, you may work for the *Declination* of the *Sun* in that place by the proportional parts of 24 Hours *Declination* to the *Hour* of difference in *Longitude*.

Note, That what is said of the *Declination*, by the same Rule you may reduce the *Planets* also to another *Meridian*.

Example.

SUppose you were in *Brasilia*, or in any other place Westward, the 10th of *April*, 1686. whose *Meridian* is distant from the *Meridian* of *London* to the Westward about 45 *Degrees*, which is three Hours of Time that the *Sun* comes to their *Meridian* later than here at *London*, where the *Table* and *Ephemeris* is made: For when it is Twelve of the *Clock* here, it is but Nine there, and being Noon there, it is Three of the Clock here; therefore to apply this *Table* to that place, I find the *Declination* for the Day aforesaid under our *Meridian* to be a 11 *Degr.* 38 *Min.* at Noon, and by reason that when it is Twelve of the Clock at *Brasilia*, it is then at *London* three Hours past; therefore by the Rule of *Proportion*, I seek what *Declination* the *Sun* hath at Three of the Clock in the Afternoon, as followeth: I take the difference of *Declination* between the Day aforesaid and the next following, which is 20 *Min.* then I say by the Rule of *Three*, If 24 *Hours* give 20 *Min.* what gives 3 *Hours*, the time of the difference in *Longitude*? *Facit* 2 *Min.* and 30 *Seconds*, which because the *Declination* increases I add to the number of the Day proposed: So I conclude the *Declination* of the *Sun* to be the 10th of *April* at Noon in the Kingdom of *Brasilia* 11 *Degr.* 40 *Min.* 30 *Seconds*. Do the like in the *Planets* that are direct; but to the Retrograde *Planets* and ♄, subtract their three Hours Motion from their places at Noon.

Again, the Day and time aforesaid in the *Bay* of St. *Sebastian*, whose *Longitude* is 58 *Degr.* to the Eastward of *London*; answering near to four Hours Time, shewing that the *Sun* comes sooner to the *Meridian* in the *Bay* of St. *Sebastian* by four Hours, than at *London*, by which reason the *Declination* is less there than at *London*, because the *Declination* doth increase: For if the *Declination* did decrease, it would be more there than at *London*. And to know the *Declination* of the *Sun* in the *Bay* aforesaid, I take the difference betwixt the *Declination* of the 10th of *April*, and the *Declination* of the Day next before, being 20 *Min.* then I say, If 24 *Hours* give 20 *Min.* what do 4 *Hours*? *Facit* 3 *Min.* which deducted from 11 *Deg.* 38 *Min.* the *Declination* of the *Sun* the 10th of *April* aforesaid, at *London*, leaveth 11 *Degr.* 35 *Min.* the *Declination* of the *Sun* at Noon in the *Bay* of St. *Sebastian*, being that when it is Twelve of the Clock there, it is but Eight of the Clock at *London*, or in any place having the same *Longitude*. Do the like in the *Planets* that are Direct; but in the Retrograde *Planets*, and ♄, add their four Hours Motion to their places at Noon.

An Example in reducing of Aspects *to other* Meridians.

OBserve this as a general Rule, That if you add in *Motion*, you must subtract in *Aspect*; and if you subtract in *Motion*, you must add in *Aspect*.

In the first of the foregoing Examples, your difference of *Meridians* was three *Hours* to the Westward of *London*, and the *Motion* of three *Hours* was added to give you the true *Degree* and *Minute* of what was sought. The Day following, which is the 10th of *April*, 1686. here at *London* we have a New *Moon* at 30 *Min.* past, at Noon subtract three Hours from that, and there Remains 9 *Hours*, 30 *Min.* which is the time of the ☌, or new *Moon* at *Brasilia*.

Again, In the second Example, your difference of *Meridian* was four Hours Eastward, and the four Hours *Motion* was subtracted to give the true *Degree* and *Minute* of what was sought for. Now for this ☌, or New *Moon* aforesaid, here I add 4 *Hours* to the time of the ☌ at *London*, which is 0 *H.* 30 *Min. P. M.* and that is 4 *H.* 30 *Min. P.M.* or Afternoon at St. *Sebastian*.

Herein note, That *Astronomers* begin their Day at Noon, so that One of the Clock Afternoon is their first Hour, Two of the Clock the second, and so forward; Six of the Clock the next Morning the 18th Hour, and Eleven of the Clock the 23th. Hour. This Rule you must observe in all *Astronomical Calculations*, and in your time when you erect *Figures*, for every *Ephemeris* is calculated to the *Meridian* of some particular place.

Of

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Of several Terms, Words of Art, and Accidents of the Planets.

Application is, when two *Planets* draw towards each other by Body or Aſpect; by *both*, that is by Conjunction; by *Aſpect*, that is by beholding each other from ſeveral *Signs*. And this happens three ſeveral ways.

Firſt, When a *Planet* that is ſwift applies to one more ſlow and ponderous, they being both Direct, as *Mars* in 10 *deg.* of *Aries*, and *Mercury*, five here, *Mercury* applies to the Conjunction of *Mars*.

The ſecond Application is, when both *Planets* are Retrograde, as *Mercury* in 10 *deg.* of *Aries*, and *Mars* in 9 *deg.* of *Aries*, *Mercury* not being Direct until he hath made Conjunction with *Mars*. This is an ill application, and an Argument of either ſuddenly perfecting, or breaking off the buſineſs, according as the two *Planets* have ſignification.

The third Application is, when a *Planet* is Direct, and in fewer *Degrees*, and a Retrograde *Planet* in more *Degrees* of the *Sign*; as *Mars* being Direct in 15 *deg.* of *Aries*, and *Mercury* Retrograde in 17 *deg.* of *Aries*: This is an ill Application, and in the *Air* ſhews great change, in queſtion ſudden alteration. But more particular Application followeth, It is when two *Planets* are drawing near each other by *Conjunction* or *Aſpect*, *viz.* ☌ △ □ ☍; where note, that ever the lighter *Planets* apply to the more ponderous, unleſs they be Retrograde.

Separation is firſt, when two *Planets* are departed but 6 *min.* diſtance; but they are not fully ſeparated till they are diſtant half of each others Orb.

Prohibition is, when two *Planets* that ſignifie the effecting of any thing demanded, are applying by *Conjunction* or *Aſpect*; and before they can come to a true *Aſpect*, another *Planet* interpoſeth his *Body* or *Aſpect*, ſo that thereby the Matter propounded is hindred or retarded; as *Mars* in 7 *deg.* of *Aries*, and *Saturn* in 12 *deg.* of *Aries*; here *Mars* ſignifies the effecting of any buſineſs when he comes to the Body of *Saturn*, who promiſes the concluſion; but *Sol* at the ſame time in 6 *deg.* of *Aries*, and he is ſwifter in Motion than *Mars*; he overtakes *Mars* and comes to *Conjunction* with *Saturn* before *Mars*, whereby whatever *Mars* or *Saturn* did formerly ſignifie, is now prohibited by the *Sun*'s firſt impediting *Mars*, and then *Saturn* before they can come to a true *Conjunction*; this is called *Conjunctional* or *Bodily Prohibition*. You muſt note, there is a Prohibition by *Aſpect* alſo: It is neceſſary to obſerve this in change of the *Air*, as well as in *Horary Queſtions*.

Refrenation is, when a *Planet* is applying to another by *Conjunction* or *Aſpect*, but before he comes to the other be becomes Retrograde; as *Saturn* in 12 *deg.* of *Aries*, and *Mars* in 7 *deg.* here *Mars* haſtens to a *Conjunction* of *Saturn*; but before he comes to the 10 or 11 *deg.* he becomes Retrograde, and ſo refrains to come to a former *Conjunction* of *Saturn*, who ſtill moves forward in the Sign: Nothing ſignified by the former *Conjunction* will be effected.

Tranſlation of Light and Nature is, when a *Planet* ſeparates from one more weighty, and applies to another more heavy; as *Saturn* in 20 *deg.* of *Aries*, and *Mars* in 15 *deg.* of *Aries*, and *Mercury* in 16 *deg.* of *Aries*; here *Mercury* being a ſwift *Planet* ſeparates from *Mars*, and tranſlates the vertue of *Mars* unto *Saturn*. It is done alſo as well by any *Aſpect*, as by *Conjunction*.

Reception, is when two *Planets* are in each others Dignities, as *Sol* in *Aries*, and *Mars* in *Leo*; here is reception by *Houſe*, it may be by Triplicity, Term, or Face, or any eſſential Dignities: The uſe of it is much, for when the effecting of a Matter is denied by the *Aſpects*, or when the Significators have no Aſpect to each other, or when it ſeems doubtful what is promiſed by *Quartile* or *Oppoſition* of the Significators; yet if mutual Reception happen between the Significators, the thing is brought to paſs, and without any great trouble, and ſuddenly to the content of both Parties.

Fruſtration, is when a lighter *Planet* would come to *Conjunction* with another; but more weighty before they come to *Conjunction*, the more weighty *Planet* is joyned to another, and ſo the *Conjunction* of the firſt is fruſtrate: As *Mercury* in 10 *deg.* of *Aries*, and *Mars* in 12 *deg.* and *Jupiter* in 13 *deg.* of *Aries*; here *Mercury* ſtrives to come to *Conjunction* with *Mars*, but *Mars* firſt goes to *Conjunction* with *Jupiter*, whereby *Mercury* is fruſtrated of the *Conjunction* of *Mars*. In Queſtions it ſignifies, as our common Proverb is, *Two Dogs quarrel*, *the third gets the Bone*: but in the Air (if three *Planets* happen ſo near together) it breeds ſudden alteration.

Peregrination; a *Planet* is Peregrine when he hath no eſſential Dignity in the Sign where he is, neither by *Houſe*, *Exaltation*, *Triplicity*, *Term*, nor *Face*. It is very material in all Queſtions to know the *Peregrine Planet*, eſpecially in Queſtions of *Theft*, for ever almoſt the ſignificator of the *Thief*, is known by the *Peregrine Planet* poſited in an *Angle*, or the ſecond *Houſe*.

Combuſtion; a *Planet* is *Combuſt* when he is not 8 *deg.* 30 *min.* diſtant from the *Sun*, either before or after him, the Significator of the *Querent* *Combuſt* ſhews he is in great fear, and overpowered by ſome Great Perſon. Many times in change of the Air, it ſhews the higher *Winds*, and great *Storms*.

Under the Sun Beams; a *Planet* is ſaid to be ſo until he be diſtant from him 17 *Degrees*.

Cazami; a *Planet* is in the Heart of the *Sun*, or in *Cazami*, till diſtant from him 17 *min.* While a *Planet* is in *Cazami* he is accounted very ſtrong.

Void of Courſe; a *Planet* is ſo when he is ſeparated from another, and doth not, during the time of his being in that Sign, apply to any other: This is moſt uſually in the *Moon*, in Judgments carefully obſerve if ſhe be void of *Courſe*, or no, for you ſeldom ſee a Buſineſs go handſomly forward when She is ſo. Some ſay, that if a *Planet* be above 12 *degr.* diſtant from the *Conjunction* or *Aſpect* of another Planet, that he ſhall be counted void of Courſe till he be within 12 *deg.* of ſome *Aſpect*.

Beſieging; A Planet is beſieged, when he is between the Bodies of the two Infortunes or Malevolents, *Saturn* and *Mars*, Pulſation or Miſſion; ſome call it rendring of Vertue; it is thus, *Saturn* in *Virgo*, and the *Sun* in *Capricorn*; here the *Sun* gives vertue unto *Saturn*, becauſe the *Sun* caſts an Aſpect to *Saturn* from his Houſe.

Almuten; It is that Planet that bears chief Rule of any Sign in any Figure.

Almuten of a Figure, is that Planet that hath moſt Dignities, or is moſt powerful in the whole Scheme of *Heaven*.

Hiz, is when a Maſculine and Diurnal Planet in the Day time is above the *Earth*, and in a Maſculine Sign; or a Feminine Nocturnal Planet in the Night time under the *Earth*, and in a Feminine Sign. In Queſtions it uſually ſhews the content of the *Querent* at the time of the Queſtion when his Significator is ſo found.

Oriental; that is, when a Planet riſeth before the *Sun*.

Occidental; that is, when a Planet ſets after the *Sun*, *Saturn*, *Jupiter* and *Mars* are called Superiors and primary Planets; they are *Oriental* of the *Sun* from their *Conjunction* with him till their *Oppoſition*, from whence, till again they come to his *Conjunction*, they are *Occidental*.

Venus and *Mercury* are called Inferiors, and they cannot make any *Sextile*, *Quartile*, *Trine*, or *Oppoſition* to the *Sun*, becauſe they are never elongated the quantity of a *Sextile* from the *Sun*; for *Mercury* is ſeldom above 30 *deg.* diſtant from the *Sun*, and *Venus* ſeldom above 48 *deg.* in their greateſt Elongations from the *Sun*. Their *Orientality* is when they are fewer Degrees of the Sign the *Sun* is in, or in the Sign proceeding their *Occidentality*, when they are in more Degrees of the Sign the *Sun* is in; or in the next following, *Luna* is *Oriental* of the *Sun* from her *Oppoſition* to *Conjunction*, and *Occidental* from her *Conjunction* to her *Oppoſition* of the *Sun*.

Direction, is when a Planet moveth forward in the Sign, as going out of 13 *deg.* into 14 *deg.* and ſo along.

Retrogradation, is when a Planet goes backward, as out of 10 *deg.* into 9, 8, 7, &c.

Stationary, is when a Planet moves not, as the Superiors do not two, three, or four Days before they turn *Retrograde*.

Longitude of a Planet or Star, is their diſtance from the beginning of *Aries*, numbred according to the ſucceſſion of the Signs.

Latitude of a Planet, or Star, is their diſtance from the *Ecliptick*, either toward the North or South.

Declination of a Planet, or Star, is their diſtance from the *Æquator*, as they decline from thence either Northward or Southward.

The Orbs of the Planets.

♄	9 Deg.	before and after.	Some do allow the *Planets Orbs* to be (in ſome of them) greater by a *Degree* or two, than what I have inſerted here.
♃	9 Deg.		
♂	8 Deg.		
☉	15 Deg.		
♀	7 Deg.		
☿	7 Deg.		
☽	12 Deg.		

Right againſt every *Planet* are the *Degrees* of this *Orb*; for when any two *Planets* are not in the *Degrees* of the *Signs* which make their party *Aſpect*, yet if they be within half the *Degrees* of each others *Orb*, they are in *Platick Aſpect*.

Example.

Suppoſe *Saturn* in third Degree of *Aries*, and *Jupiter* in the ninth Degree of *Gemini*; here they are in *Platick Aſpect*, becauſe they are within the half of each others Orb: But the *Partile Aſpect* is of greateſt force; had *Jupiter* been in the third Degree of *Gemini*, then the *Aſpect* had been *Partile*.

A Table of the Fortitudes and Debilities of the Planets, both Eſſential and Accidental.

Eſſential Dignities.

A *Planet* in his own Houſe, or in mutual Reception with another by Houſe, ſhall have Dignities, 5
In his Exaltation, or in Reception by Exaltation —— 4
In his own Triplicity, 3
In his own Term, 2
In his Face —— 1

Accidental Fortitudes.

IN the 10*th* Houſe, or Aſcendant —— 5
In the 7, 4, or 11 Houſes, 4
In the 2, or 5 Houſes, 3
In the 9*th* —— 2
In the 3*d* —— 1
Direct to *Sol* and *Luna*; this is void —— 4
Swift in Motion —— 2
Saturn, *Jupiter* and *Mars* Oriental —— 2
Venus and *Mercury* Occidental —— 2
The *Moon* Increaſing, or Occidental —— 2
Free from Combuſtion, and *Sols* Beams, 5
In the Heart of the *Sun*, or *Cazami* —— 5
In Partil *Conjunction* with *Jupiter* and *Venus*, 5
In Partil *Conjunction* with the *Dragons Head*, 4
In Partil *Trine* to *Jupiter* and *Venus* —— 4
In Partil *Sextile* to *Jupiter* and *Venus*, 3
In *Conjunction* with *Cor Leonis* in 25 of *Leo*, 6
In *Conjunction* with *Spica Virginis*, in 19 *deg.* of *Libra* —— 5

Debilities.

IN his Detriment, 5
In his Fall —— 4
Peregrine —— 5

Debilities.

IN the 12*th* Houſe, 5
In the 8*th* and 6*th* Houſes —— 2
Retrograde —— 5
Slow in Motion —— 2
Saturn, *Jupiter*, or *Mars* Occidental —— 2
Venus and *Mercury* Orientall —— 2
Luna Decreaſing in Light —— 2
Combuſt of the *Sun*, 5
Under the *Sun* Beams, 4
Partil *Conjunction* with *Jupiter* or *Mars*, 5
Partil *Conjunction* with the *Dragons Head*, 4
Beſieged of *Saturn* and *Mars* —— 4
Partil *Oppoſition* of *Saturn* or *Mars* —— 4
Partil *Quartile* of *Saturn* or *Mars* —— 3
In *Conjunction* with *Caput Algol*, in 24 *deg.* of *Taurus*, or within 5 Degrees —— 5

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Fortitudes of Pars Fortunæ.

IN *Taurus* or *Pisces* —— 5

In *Libra*, *Sagittarius*, *Leo*, or *Cancer*, 4

In *Gemini* —— 3

In *Virgo*, so it be in the Terms of *Jupiter* or *Venus* —— 2

If in *Conjunction* with *Jupiter* or *Venus*, 5

In *Trine* with *Jupiter* or *Venus* —— 4

In *Sextile* with *Jupiter* or *Venus* —— 3

In *Conjunction* with the *Dragons Head*, 3

In the *1st* or *10th* Houses —— 5

In the *7th*, *4th*, or *11th* Houses —— 4

In the *2d* or *5th*, 3

In the *9th* House, 2

In the third House, 1

In *Conjunction* with *Regulus*, in 25 *deg.* of *Leo* —— 6

In *Conjunction* with *Spica Virg.* in 19 *deg.* of *Libra* —— 5

Not Combust, or under the *Suns* Beams, 5

Debilities of Pars Fortunæ.

IN *Virgo*, *Capricorn*, or *Aquarius* —— 5

In *Aries* neither gets nor loses —— 0

In the Terms of *Saturn* or *Mars* —— 2

In *Conjunction* with *Saturn* or *Mars* —— 5

In *Opposition* with *Saturn* or *Mars* —— 4

In *Quartile* of *Saturn* or *Mars* —— 3

In *Conjunction* with the *Dragons Tail*, 3

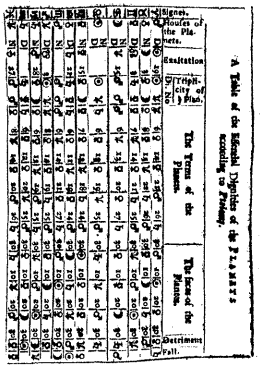
In the *12th* House, 5

In the *8th* House, 4

In the *6th* House, 4

Combust —— 5

With *Caput Algol*, in 21 *deg.* 16 *min.* of *Taurus*.



Of the Faces of the Signs.

These foregoing *Tables* are so plain and easie, that they need no Explanation; only when you have collected the *Fortitudes* and *Debilities* of the *Planets* in any Figure; then observe which is the greatest in number, and substract the least from the greatest, and the Remainder shews you what *Dignities* or *Debilities* the Planet hath, and according to the number thereof give your Judgment.

And note, That the first of these three *Tables*, which is the Table of the *Essential Dignities*, and *Debilities* of the Planets, is of greatest use in change of the *Air*.

THe first Face of *Aries* is the Face of *Mars*, and signifies Boldness, Fortitude, Preferment, and Immodesty; it is compleat and strong in its properties and vertues.

The second Face is the Face of the *Sun*, and signifies Nobility and Preferment, Rule and Dominion.

The third Face is the Face of *Venus*, and signifies *Women*, and their skill in Manual operation and Trades belonging to that Sex, Courtesies, Play, Joy, and Mirth.

The first Face of *Taurus* is *Mercuries*, and is compleat in his Nature; is good to Plow, Sow, and build; to frequent the company of Lawyers, learned and wise Men; to measure and divide Land; to practice Geometry.

The second Face is belonging to the *Moon*, and signifies Power, Nobility, and Honour; to spoil Towns, and dispeople them, and bring great necessity upon People.

The third Face is the Face of *Saturn*, and signifies Misery and Bondage, Slavery, Necessity, Want, and Vileness.

The first Face of *Gemini* is *Jupiters*, and is compleat in its Nature, and signifies Writing, Casting of Account, receiving and paying Moneys, delivering Petitions, and exercising such Feats of Wit by which little Money is gotten.

The second is the Face of *Mars*, and signifies Oppression and Labour, obtaining things by much study and difficulty, and if it signifie any at all it is Knavish Wit.

The third is the Face of the *Sun*, and signifies Forgetfulness, Disdain, Jesting, and Playing.

The first Face of *Cancer* is the Face of *Venus*, compleat in its own Nature, and signifies Strength and Sensibility, Community, Subtilty, and favour of the Men they desire.

The second is the Face of *Mercury*, and signifieth Mirth, Jesting, and playing with Women, Riches

Riches and Fruitfulness: So proportionably of the rest.

The Radiations of the Signs and Planets.

BY this *Table* you may know when any Aspect is; as suppose a Planet in *Aries* casts his *Sextile* Aspect to the same Degrees in *Aquarius* and *Gemini*, and a *Square* to *Capricorn* and *Cancer*, and a *Trine* to *Sagittarius* and *Leo*, and an *Opposition* to *Libra*, as you see in the upper Line; and so of the rest in the Left-hand Column.

Likewise a Planet in *Libra*, casts a *Sextile* Aspect to the same Degrees in *Sagittarius* and *Leo*, and a *Square* to *Capricorn* and *Cancer*, and a *Trine* to *Aquarius* and *Gemini*, and *Opposition* to *Aries*; as you may see by the Right-hand Column, and the Aspects in the lower Line. The Example being easie, I will say no more.

By the foregoing *Table* you may also know when exact *Crysis*, or *Critical Days* fall; As for Example, If the *Moon* should be in 10 Degrees of *Aries* at the *Decumbiter*, she makes her first *Crysis* when she comes to be in 10 Degrees of *Cancer*, that being in a *Square* to the same Degree in *Aries* at the *Decumbiter*; and when she is in 10 Degrees of *Libra*, her second *Crysis* being in *Opposition* to *Aries*; and the third *Crysis*, when she is in 10 Degrees in *Capricorn*; and the fourth *Crysis*, when she comes to the same Degree in *Aries*, as she was in when the Patient first fell sick.

GEO.

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The Second Part of COSMOGRAPHY,

VIZ.

GEOGRAPHY.

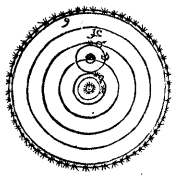
GEOGRAPHY, is an *Art* that teacheth to make a true deſcription of the Superficies of the whole *Earth*. It is divided into *General* and *Particular*.

The *General* comprehends not only the whole *Earth*, as far as is diſcovered that is habitable, but alſo that part that lies under the Water. Now the deſcription of the *Waters* belongs to *Hydrography*, of which more anon.

The Particular deſcription of the *Earth*, extends only to ſome Particular parts thereof, and is divided into *Chorography*, and *Topography*; ſo that as *Coſmography* is a deſcription of the whole *World*, and *Geography* of the *Earth*; ſo is *Chorography* a deſcription of every Particular *Countrey*, or part of the *Earth*, ſuch as is deſcribed by particular *Maps*, as of *England*, *France*, *Spain*, and the like. And whereas *Topography* is a deſcription of every particular place, as *Cities*, *Towns*, *Foreſts*, *Deſarts*, *Woods*, *Mountains*, *Valleys*, *Lakes*, *Marſhes*, *Gulphs*, *Bays*, *Rivers*, *Streights*, *Havens*, &c. the knowledg thereof cannot but be of great uſe, and delight to all men, eſpecially to *Travellers*.

Of the Motion of the Earth.

IN the *Copernican Hypotheſis*, neither the *Sun*, nor *Firmament* have any *Motion*, but the *Sun* is ſaid to be ſo diſpoſed in the middle, that the *Globe* of the *Earth*, together with the *Sphære* of the *Moon* is continually carried about it, with a moſt rapid Motion; according to this *Figure*.



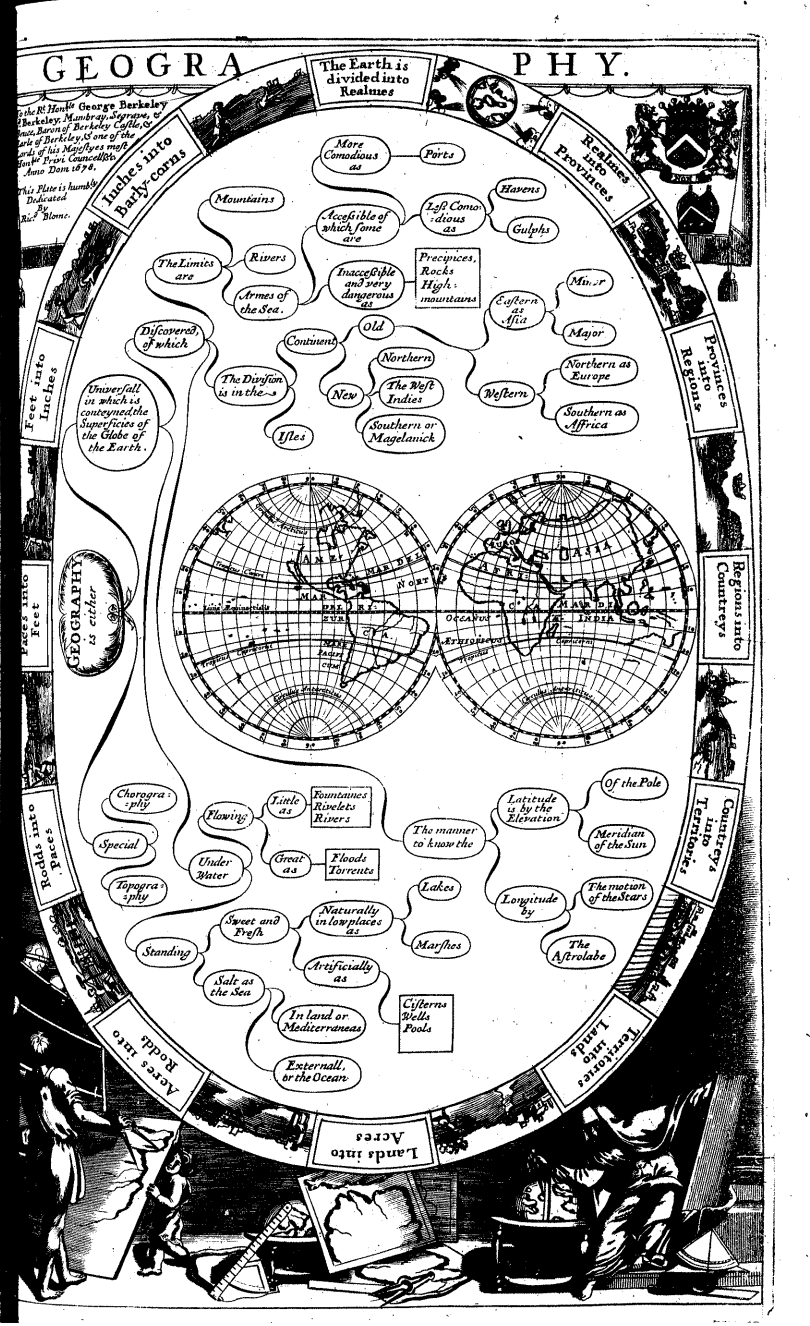
The Arguments, and Anſwers *pro*, and *con*, are many on both ſides; but the moſt unanſwerable proofs of the truth of the *Ptolomæan*, or common received *Hypotheſis* are theſe.

First, If our *Terreſtrial Globe* were not placed in the midſt or *Center* of the *World*, it would not be plainly made out, how the mid part of *Heaven* ſhould be conſpicuous to us, or how in the *New Moon*, the *Sun* and the *Moon* could be ſeen both at the ſame time in parts *Diametrically* oppoſite. And whereas they anſwer, That the *Earth* is but a ſmall *Punctum*, or *Point* in reſpect to the *Heavens*, and that therefore all this might well enough be without any contradiction to their *Hypotheſis*, a greater Abſurdity would ſtill follow, that is, that all the part of *Heaven* beneath the *Horizon*, would be equally ſeen by us with thoſe parts above. Moreover, if the *Earth* were not placed in the middle of the *World*, there could not be a perpetual *Æquinoctial* in the *Sphæra recta*, in regard all the *Circulations* of the *Sun*, would be unequally cut by the *Horizon*. Alſo if the *Earth* were not in the middle of the *World*, there would not always be an *Eclipſe* of the *Moon*, when ſhe is *Diametrically* oppoſite to the *Sun*, ſince it would often happen that the *Globe* of the *Earth*, would not be exactly in the middle, and equally oppoſite to both thoſe *Planets*, within the Line drawn from the *Sun*, through the middle part of the *World* to the *Moon*; whereas in *Lunar Eclipſes* are never known, but when the *Moon* keeps her oppoſition with the *Sun*, through the middle of the *World*; the *Moon* then being exactly in the middle, as *Aſtronomers* have always obſerved.

Next, there is this *Pyhſical* reaſon to be given, why the *Earth* is in the *Center*, namely, becauſe all heavy things have their tendency thither, and conſequently the *Earth*, as being of that Gravity which renders it unfit for Motion, and inclines it to a ſettlement in the loweſt place, or *Center*.

Laſtly, in the *Copernican Hypotheſis*, the *Globe* of the *Earth*, is affirmed to be moved, not only about the *Center* of the *World*, but alſo about its own *Axis*; ſo as ſucceſſively to receive the diurnal Light according to its different parts; but to refute this Aſſertion, hereafter it ſhall be made appear, that the *Earth* is a *Magnetick Body*, and conſequently uncapeable of being moved about its own *Axis*, and this is the opinion of *Galtruchij*. But a larger Diſcourſe of this ſubject, which recites the Opinions of the *Pythagoreans*, *Ptolomains*, and *Copernicans*, you will find in the fifth Chapter of *Varenius* his *Geography*.

The



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The Figure of the Earth.

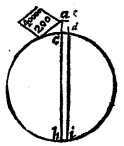
THat the *Earth* is a round *Figure*, is proved by ſeveral Arguments. Firſt, by the riſing of the *Stars*; for in their riſing they appear firſt to thoſe that live moſt Eaſternly; next by the *Elevation* of the *Pole*; for the nearer any one comes to the *Pole*, the higher he is elevated above the *Horizon*; another Egregious proof is this, That a *Perpendicular* falls in any part whatſoever at right *Angles* upon the *Earth*, which could not be if the *Earth* were plain, and not round according to this *Figure*. Moreover, If the *Superficies* of the Earth were plain, and not round, as the *Chineſes* are of opinion, it would not be every where habitable, in regard few Men would be able to ſtand upright in it; for as experience makes it out, they only can ſtand upright upon the *Earth*, whoſe *Longitude* of *Body* is in the Line of Direction; for thence it is that they ſtand Perpendicularly upon the *Center* of the World, excepting in this caſe, thoſe that poſſeſt the middle of the plain of the *Earth*; which the better to demonſtrate obſerve this *Figure*, where there is deſcribed a right Line for that right *Pavement*, which tends directly to that Point of Heaven, which anſwers to the *Horizon*. Next there are imagined to proceed from the *Center* of the *Earth*, *Lines* paſſing at *rights Angles* through the *Superficies* of the ſaid *Earth*.

The *Earth* excavated in ſeveral parts takes in the Waters, ſo that the Water together with the *Earth* makes one perfect *Globe*, which is thereupon called the *Terraqueous Globe*; However ſome are of opinion, that the *Globe* of the *Earth* is diſtinct from that of the Water, but the abſurdity of this opinion is eaſily evinc't by the *Eclipſe* of the *Moon*, whereas it is plainly evident, that there is but one Shadow of *Earth* and *Water*, and that *Conical*, and conſequently that the *Globe* of the *Earth* and *Water* is one and the ſame, which the better to confirm, it muſt be conſidered, that there is but one *Center*, to which both the weight of the *Earth* and *Water* tend; for let *Water* be thrown down any where, it will certainly fall the ſame, as *Earth* directed from the ſame place. Nor can it be imagined, if there were two *Globes*, how there could be any paſſing from the *Globe* of *Water* to that of the *Earth*. And thoſe that frequent the *Seas* eaſily from the ſight of either *Pole*, ſhew that they are carried about the ſame *Center* with that of the *Earth*. Moreover it is certain; that the *Sea* in its outwards *Superficies* is of a Form ſo *Spherical*, that it makes but one rotundity, and conſequently but one *Globe* with the *Superficies* of the *Earth*; and this is very manifeſt by a *Ship* homeward bound, and returning into the *Haven*, when thoſe aboard her ſee firſt the *Turrets* and *Battlements* of publique *Edifices*, and afterwards the lower parts, which can proceed from no other cauſe, but from the ſwelling, and rotundity of the Water. as appears by this *Figure*, And for the ſame reaſon the *Pole* appears by Degrees more and more elevated above the *Horizon* to him that *Sayls* towards it, under the ſame *Meridian*.

Note, that the *Superficies* of the *Sea* towards the extream *Shoars* falls more ſenſibly from its main bulk, than from any part of the *Superficies* of the *Earth*; in regard there is a deſcent to the *Sea* from all parts of the *Earth*, as the fall of *Rivers* demonſtrates; for the *Waters* by their own natural gravity deſcend not but from a higher place to a lower, and conſequently it may be laid down for a Maxim, That the whole Maſs of *Water*, or *Sea* in its utmoſt *Superficies* is lower than the whole *Superficies* of the *Earth*; for were that part of the *Sea* which is near the *Shoar*, higher than the *Shoar*, it cannot be otherwiſe imagined, but that it muſt needs pour it ſelf upon it; and by the Rule of *Proportion*, the ſame may be affirmed of any other part of the *Sea*; for were one part more imminent than another, the higher part according to its fluxible nature would ſtill fall upon the lower, as tending to a Level, and to keep an equal diſtance from the *Center* of the *World*. And whereas to thoſe that look upon the *Sea* from the *Shoar* it ſeems to riſe, and ſwell up more and more. This ariſeth from the fallacy of the Sight, as by the Rules of *Opticks* may be more plainly demonſtrated.

Of the Magnitude of the Earth.

THough the *Globe* of the *Earth*, only conſidered in it ſelf may be ſaid to be a vaſt Bulk; yet in reſpect of the *Heavens* it is but a little *Point*.



The *Compaſs* of the *Earth*, is to be found out ſeveral ways; the firſt is that of *Mauroly-cus*, according to this *Figure*, where the *Altitude c, a*, of the Mountain; for Example, *Ætna* is ſaid to be 2 *French Leagues*, which is four *Engliſh Miles*, from whence the proſpect upon the *Sea* by the Line *a, d*, will conſequently be the *Longitude* of the ſenſible *Horizon*, and the Line touching the *Circle d, h, i*, which is taken for the *Compaſs* of the *Earth*; then ſuppoſe that diſtance, or Line *a, d*, to be 200 *Furlongs*, the ſquare whereof is 40000. Likewiſe let a right *Angle* be imagined from the *Line a, h*, cutting the whole *Circle* through the *Center* thereof, under the *Latitude a, g*, which is the ſame with *c, a*, Theſe things thus laid down, whereas the ſaid right *Angle a, g, h, i*, according to the 36*th* Propoſition of the ſaid Book of *Euclide*, is to be equal

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equal to the Square of the *Tangent* Line *a, d*; It will be thence eaſy to determine of the ſaid *Right Angle*, and the *Longitude* thereof.

But the more clear way of finding out this *Compaſs*, is by the *Elevation* of the *Pole* in two places: For Example, Two *Cities* ſo far diſtant from each other under the ſame *Meridian*, that the *Pole Elevated* in one more than in the other one *Degree*, or ſome known part of a *Degree*; For Example, a fourth part, from whence the whole *Degree* may eaſily be computed: Now one *Degree* in *Heaven* anſwering to 30 *French Leagues*, and there being 360 *Degrees* in all, *Multiply* 360 by 30, and the *Product* is 10800 which is the compaſs of the *Earth*. But according to the *Engliſh* Account, the *Circumference* is 21600 *Miles*. From whence the *Diameter* according to the Triple proportion allowed by *Geometricians*, between that and the *Circumference*, will be found to be 3436 *Leagues* omitting all *Fractions*, and the diſtance from the *Surface* to the *Center*, 1718 *Leagues*. Hence alſo may be made the Computation of the whole *Superficies* of the *Earth*, which will be 37114200 Square *Leagues*; and in like manner the whole ſolidity 2125406500.

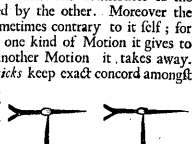
Note, that this univerſal Bulk of the *Earth*, conſidered as to its ſolidity, or depth, is divided into ſeveral *Regions*, according to this *Figure*, whereof the firſt is that which is called the outwardmoſt of the *Surface*; the ſecond is the next beneath, where for the moſt part *Stones*, *Metals*, and the like are generated, in which alſo are certain *Paſſages*, and as it were *Channels*, through which *Waters* from the *Sea*, are devolved towards the Generation of *Rivers* and *Fountains*. Alſo hitherto belongs *Subterraneal Fires*. The third reaches from thence to the *Center*, and this according to the whimſical fancy of ſome, is ſaid to be the place or Priſon of the damned.

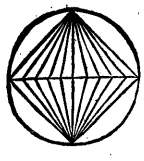
However, *Geographers* affirm the Surface of the *Waters*, to be double to that of the *Earth*; yet certain it is, that as to the whole *Maſs*, the *Earth* is much the biggeſt, of which there is this material proof, *viz.* that neither all the *Earth* is covered with *Water*, neither are there any *Waters* in any part under which there is not *Earth* of far greater profundity than the *Water* above; for the greater profundity of the *Earth*, is accounted to be above 1700 *Leagues*, whereas the *Sea* where it is deepeſt, ſcarce exceeds one League in depth, as the skilfulleſt *Mariners* have experimented by ſounding the Depth.

That the Earth is a Magnetick Body, and firſt of the nature of the Magnet, or Loadſtone.

IT is to be underſtood, that the *Loadſtone* is a Stone that hath the virtue of attracting *cognate Bodies*, and directing it ſelf to certain parts of the *World*; thoſe are ſaid to be *cognate Bodies* which have a *Magnetick virtue*, either proper to themſelves, as other *Magnets*, or borrowed from the *Magnet*, as *Iron*. But theſe kind of Notions are beſt made good by Experiments.

First, we obſerve that *Iron*, that is *Iron Rings* moved to the *Magnet*, preſently cleave to it, and draw each other ſucceſſively in manner of a Chain; eſpecially if the *Iron* be ſubſtantial, well purged and clear of Droſs. Secondly, That a *Magnetick* virtue is contracted by the *Iron*, but not retained by it when the *Magnet* is removed, except it be drawn out very long, and in form of a *Rod*, or *Staff*. Thirdly, That the *Magnet* exerciſeth its attractive force only in certain determined *Points*; and that theſe *Points* are as it were two *Poles*, and placed as it were at the extremities of a certain *Axis*, as *a, b*, in this *Figure*. Theſe *Poles* are beſt diſcovered by the tendency of a *Needle* that way. Fourthly, That theſe *Poles* are directed to the contrary parts of the *World*, one to the North, and therefore called the *North Pole*, and the other to the *South*, and called the *South Pole*. Theſe *Magneticks* beſides their attractive, have alſo a directive virtue, whence the *Needle* in the *Mariners Compaſs* is of ſuch great uſe for the *Navigating* of *Ships* from *Port* to *Port*; nor is it of ſmall uſe in *Dyalling* for the drawing the *Meridian Line*. Fifthly, That the *Poles* as they are of a contrary direction, *viz. North* and *South*, ſo alſo they are of a contrary virtue; for that which one draws to it ſelf, is repelled by the other; the virtue which one contributes to the *Iron* is deſtroyed by the other. Moreover the ſame *Pole* is ſometimes contrary to it ſelf; for what virtue by one kind of Motion it gives to the *Iron*, by another Motion it takes away. Sixthly, *Magneticks* keep exact concord amongſt themſelves when they meet near *Poles* of a contrary direction, ſuch as this *Figure* repreſents; but on condition that no more than two be preſent at a time; for if a third comes in the way all is diſturbed. Alſo thoſe diſagree, and exerciſe Hoſtility one with another, which tend both to the ſame term, and draw virtue from the ſame *Fountain*, as is to be ſeen in the firſt *Figure* of this *Problem*; where three *Needles* fixt all to the ſame *Pole*, depart one from another. Seventhly, As to propagation and extenſion of the *Magnetick* virtue in its ſubject, obſerve that this virtue from the *Magnet*, within the *Sphære* of its proper Activity is diffuſed in an inſtant; for of many *Verſories* thoſe which are diſtant are agitated



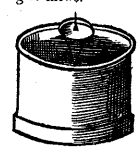


gitated at the ſame time with the neareſt, for as much as interpoſed Bodies hinder that propagation. Moreover, as is repreſented in this *Figure*, it ſo affects its ſubject, that it is divided as it were by an *Æquator* into two contrary parts, each whereof as it were flows by certain *Rays* to a Point, being that which is termed the *Pole*; and it is therefore called the *Center of Magnetick* virtue, in which ſenſe they ſay that the *Magnet* hath the *Center* of its virtue in the *Circumference*. And more than this, that in the ſame *Circumference* it hath two *Centers*, of an oppoſite virtue. Eighthly, It is to be obſerved, that in *Magneticks* there is a manifold kind of *Verticity*, *Motion*, or *Agitation*; the firſt and chiefeſt is that *Verticity* by which it is directed to the *Poles* of the *World*, and conforms as much as may be to its own *Axis*, with the *Axis* of the *World*; nor is there any other reaſon to be given, why *Poles* of a different direction are moſt friendly, and mutually conſerve themſelves, but that they may be united together to conſtitute the *Axis*, and more firmly affixt to thoſe oppoſite parts of the World; whereas on the contrary, *Poles* of the ſame direction have an antipathy, and mutually deſtroy each other, by Reaſon they cannot be joyned together near the ſame *Axis*; for the *Poles* that are alike, regard both the ſame part of the World, whereas of thoſe parts which meet into a *Cloſure*, one ought to regard the *North*, the other the *South*.

The ſecond Verticity is the *Declination*, or *Variation*, by which it declines from its *Pole* either Eaſtwards, or Weſtwards. But this is different in different parts of the World. Now to find its quantity for any given place, ſee the *Verſory* directly in the *Meridian Line Aſtronomically* drawn; for the *Angle* which it will make with that *Meridian Line* gives the *Degrees*.

The third ſort of Verticity is *Inclination*; for if a *Needle* not yet touch'd be placed in a *Rhomb*, and fix'd upon a *Cork* in ſwiming Water, or ſo hung upon a *Thread*, as to keep its *Æquilibrium*, as ſoon as it ſhall draw the *Magnetick Virtue* by the application of the *Magnetick*, it will incline it ſelf by certain Degrees to the *Horizon*, and to the *Pole* of the *Earth*, as in this *Figure*; though if you ſtand under the *Æquator* of the *World*, it will become *Parallel* to the *Horizon*; but it will always incline to the *Pole* of the *Earth* in ſuch a proportion as you ſhall recede from the *Æquator*, till at length it erects perpendicularly when you come to the *Pole*. From the Inſpection of this *Magnetick Declination*, a *Circle* divided into its *Degrees* being made uſe of, true Judgment may be made of the Elevation of the *Cœleſtial Pole*, as that famous Author *Grandamicus* hath ſufficiently demonſtrated; who alſo ſhews, how from *Declination* and *Inclination* joyn'd together, conjecture may be made of *Geographical Longitudes*, if from certain Obſervations there be any Information of the proper *Inclination* and *Declination* of the *Country* whoſe *Longitude* is ſought, although the variation of the *Magnet* ſeems ſomewhat too uncertain for any true Judgment to be made thereof.

Note, That the *Magnet* hath not that power of ſtaying it ſelf at the *Eaſt* and *Weſt*, in ſome *Oriental* or *Occidental Points*, as it hath in its *Poles*, but is rather ſituate in a certain *Meridian Circle*, which of its own nature compoſeth it ſelf to the *Worlds Meridian*. Whence conſequently it comes to paſs, that in certain parts it fixes to the *Eaſt* and *Weſt*, but that in reality it hath not that virtue plac'd in it, except in ſome kind of *Meridian*, as is hereby proved; *viz.* becauſe the ſame *Meridian* being kept, though that part which was turned to the *Eaſt* becomes *Occidental*, nevertheleſs it perfectly reſts. This is to be obſerved in a *Vertical Needle* ſwiming, ſuch as this *Figure* ſhews.



From what hath been ſaid, may very well be inferr'd; First, That the *Magnet* hath not only its *Æquator*, by which it is divided into the *Septentrional*, and *Meridional Pole*, but that there is alſo found in it a *Meridian*, by which it is divided in the *Oriental* and *Occidental Parts*. Secondly, That the *Circular Motion* is no leſs natural to the *Magnet*, than it is to a *Stone* to move downwards, or to *Fire* to move upwards, and that from an inward Principle of Nature; inſomuch, that being by any Accident diverted from its proper Site, it betakes it ſelf to it again, by cleaving either to the *Poles* of the *World*, or to the *Oriental* and *Occidental Parts*. Thirdly, That ſuch is the nature of *Magnetick virtue*, that it renders whatſoever Subject it effects every way quiet and immoveable about its *Center*, foraſmuch as from one part through the *Poles* its *Axis* is rendred immoveable; then through the *Meridian* the Motion about the *Axis* is hindred.

From what hath been ſaid of *Magnetick virtue* in general, we paſs on to affirm, that there is actually in the *Earth* a *Magnetick virtue*, being confirmed in this Opinion by the Authority of the moſt Learned in *Magnetick Philoſophy*, that later Ages have produc'd. For this part of *Science* hath not been long revealed to the World, and the many ſubſtantial Reaſons they give for this their Aſſertion: First, That there is a *Magnetick virtue* derived from the *Earth* to *Iron*, is apparent from the Obſervation of long *Iron Bars* ſet

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set upright on the *Earth*, their lowermost part being always imbued with the virtue of that *Pole* which is next, and which is proper to that *Country* in which they are, as with us the *North*; and hereof any one may be himself an *Eye-witness*, by applying the *Verfory* to any of these *Bars* or *Rods* of *Iron*. Secondly, No other Reason can be given of the *Magnetick Inclination* than now treated of, but because the *Pole* of the *Earth* draws the *Needle* to it; neither is there any other Reason of *Declination*, but the various temper of the *Earths*, whence either more or less the Virtue is infused, and the *Verfory* disturbed from its Natural course; for in this matter we may *Philosophize* in the same manner as concerning the *Magnet Stone*, which the inequality of parts performs the same thing, as is often found by Experience.

Thus it may also be asserted, that the *Terrestrial Pole* is the cause of that Verticity, by which the *Needle* touch'd declares to us the *Poles* of the World; for as the *Magnet* or *Load-Stone* conforms to it self the friendly *Poles* of the *Verforian Needle*; so the *Earth*, which is in the nature of a certain great *Magnet*, will conform to it self all these lesser *Magnetick Bodies*, and so will change their proper Site; that is to say, that *Pole* which inclin'd towards the South will be attracted towards the North, by the force of the *Terrestrial Pole*.

Neither can that *Verticity*, and *Magnetick* Direction be ascribed (as some Write) to *Heaven* on the *Celestial Pole*; for if it had that force of attracting, the *Needle* would not incline to the *Pole* of the *Earth*, but rather would be erected upwards to *Heaven*. Moreover, if the *Celestial Pole* had the efficacious force of attracting to it the *Magnetick Needle*, the said *Needle* would decline from it. Nor have these Parts that lye near the *Pole* this attractive force; for were it so, for as much as their Motion is Circular, there must needs be a variation of the *Magnetick Needle*: But this common Experience contradicts.

Note, That this force of the *Terrestrial Pole* is only exercised upon the *Poles* of the *Magnet*, which nevertheless being by greater force, may possibly decline elsewhere. But so long as the *Magnet vertically* constituted can act freely, as when it swims upon *Quicksilver*, or the like, it will compose its *Meridian* within the *Meridian* of the World, without any Declination, by reason the *Magnetick Meridian* is not moved by any other, nor hath it any *Antipathy*, or *Sympathy* with the *Polar virtue*. The same thing may be as conveniently done by a *Vertical Needle* floating on the Water, as in the last *Figure*; and by this means may be had the *Universal Meridian*, without *Declination*, in any *Country* whatsoever.

But when we treat of the *Magnetical virtue* that is in the *Globe* of the *Earth*, it is not to be understood of any piece of *Earth*, but only of that which is pure and unmixt.

Of the Immobility of the Earth, both at the Center, and about the Center of the World.

THe *Terraqueous Globe*, by reason of its innate gravity, hath this property, that being placed in the midst of the World it resists all Motion, as well upwards as side-ways: (For that is the proper effect of *Gravity*.) But however it is thus moveable in the *Center*, or at the *Center* of the *World*; yet it is moveable about its *Center*. For this is certain, That a *Globe* of equal Gravity hung in an *Æquilibrium*, may without any great force be inclined and moved Orbicularly. Nor can the *Terraqueous Globe* from any part resist that Motion, resting only upon its *Center*. Neither doth it press hard upon it self, forasmuch as heavy things placed in their proper place discover no heaviness or weight. Therefore it is from the weight of the *Earth* that it is immoveable about its *Center*; nor doth that hinder but that it might be every way moved Orbicularly, either by the *ebbing* and *flowing* of the *Seas*, or by the violence of the *Winds*. Yet that it is not thus moved, since in one and the same place of the *Earth* there always appears the same *Elevation* of the *Pole*; to which may be added the Testimony of *Holy Writ*, affirming, that the *Earth* stands firm for ever upon its own Foundation. Besides, that there is a necessity of this Immobility of the *Earth*, about, in, and at its *Center*, for the better succeeding of all Natural Productions and Conveniences of Mankind.

Now to apply what hath been said herein, I shall not doubt to affirm, (following the Authority of that eminent Author *Grandamicus*,) That this Immobility of the *Earth* about its *Center* proceeds from the *Magnetick virtue*; for it imports no less that the *Earth* be immoveable about its *Center*, than in the *Center*. *GOD* in his Providence enduing all Natural things with those Qualities that are requisite for their preservation and consistence: But there is no Quality fitter for this purpose than the *Magnetick virtue*; nor was it indeed given by *GOD* to any other end, being it comprehends all things that conduce to this sort of Immobility, and since it renders the *Poles* and the *Meridian* of themselves Immoveable; nor is there any other thing required to the Immobility.

Of the EARTH, its Circumference, Superficies, &c.

THe *Circumference* of the *Earth* (which if considered with the *Firmament*, is but a Spot) is divided into 360 *Parts* or *Degrees* (as the *Heavens* are) and each *Degree* contains 60 *English Miles*, by which Account the whole Circumference is 21600 *Miles*, the *Diameter* (as all round Bodies being one third) is 7200 *Miles*; so that by consequence, the *Semidiameter* which reaches to the *Center*, is 3600 *Miles*. But as it properly belongs to *Geography*, to give an Account of the *Latitude* and *Longitude* of Places, so to find out the Thickness of the *Earth* seems to belong to *Geometry*.

The

The whole Superficies consists of *Earth* and *Water*, as already treated of; which is divided into two parts, the one Visible, and the other Invisible: And divided into five *Zones*, which are treated of in *Cosmography*, or *Astronomy*.

The Visible part of the *Earth*, which was appointed by *Gods* Providence for the Seat of *Man*, and other living *Creatures*, lay at first all under *Water*; but at the Command of *God* at the Creation, the *Waters* were separate from the *Earth*, and are now its Bounds, which according to their various Shapes have their Names. The Borders of the *Sea* serve likewise for the *Continent*, some of which Borders are of easie Access, and proper for *Navigation*; others Inaccessible, and hard to be approached, as those places where there are *Precipices*, *Rocks*, and high *Hills*. Such as are convenient, are either more or less commodious: Of the first sort are the *Sea-Ports*, *Harbours*, and *Bays*, which said places are (or ought to be) secure from all danger of *Seas*, *Winds*, and the like: But there is this difference between a *Harbour* and a *Bay*, that Ships may safely Ride in an *Harbour*, but not in a *Bay*.

The Habitable Land is divided into *Continents*, and *Islands*. A *Continent* is a great part of the Surface of the *Earth*, as *Russia*, *Tartary*, *Germany*, &c.

An *Island* is a part of *Earth* surrounded with *Water*, as *Great Britain*, *Ireland*, *Madagascar*, *Japan*, *Jamaica*, *Barbadoes*, &c.

A *Peninsula*, or *Chersonesus*, is a part of *Land* almost encompassed with *Water*, being only joyned to the Main *Continent* by a narrow *Isthmus*, or *Neck* of *Land*; as *Morea* in *Greece*, *Panama* in *South America*, &c.

A *Cape*, or *Promontory*, is a *Hill* that shoots it self forth into the *Sea*; as the *Cape of Good-Hope*, in the South part of *Africa*.

A *Point*, or *Foreland*, is a narrow piece of Ground Point-wise into the *Sea*.

The other Invisible Superficies of the *Earth*, is either Uninhabitable, or covered with Running, or standing Waters.

The *Running-Waters* are either lesser, as *Springs*, *Brooks*, and *Rivulets*; or greater, as large *Rivers*, and *Torrents*.

The *Standing-Waters* are *Sweet*, *Salt*, or the like. These gather naturally in long places, as *Lakes*, and *Marshes*; or Artificially, as *Wells*, *Cisterns*, and *Ponds*.

The *Waters* are generally divided into *Seas*, *Lakes*, and *Marshes*; or Artificially into *Wells*, *Cisterns*, *Ponds*, *Gulphs*, *Rivers*, &c. as by the *Hydrographical Table* following the division of the *Waters* will better appear.

The Latitude and Longitude of Places.

THe *Latitude* and *Longitude* of Places should next follow; but having largely treated thereof in *Cosmography*, or *Astronomy*, 'tis thought convenient to omit them here, rather than to have two Discourses of one and the same Subject.

☞ The Art of *GEOGRAPHY*, as also that of *COSMOGRAPHY*, are of so large a *Latitude*, that it cannot be comprehended in so narrow a *Compass*; however the most essential things are taken notice of. But having lately published a Volume in large Folio of that Subject, entituled *Cosmography* and *Geography*, in two Parts (the first containing the General and Absolute Part thereof, Translated from the Works of that eminent and much esteemed *Geographer VARENIUS*. The Second Part being a *Geographical Description* of the World, taken from the *Notes* and *Works* of the Famous Monsieur *Sanson*, late *Geographer* to the *French* King; Illustrated with *Maps*; And for the further compleatment thereof are added about 100 *Geographical* and *Hydrographical Tables* of the *Kingdoms* and *Isles* in the World, with their chief *Cities*, *Ports*, &c.) I have thought fit to give the *Reader* an Account of the Heads therein treated of, with some *Cosmographical*, *Geographical*, and *Hydrographical Tables*, taken notice of in the Second Part, *viz. Sansons Geography*. Which said *Work* having been so well received and approved of by experienced *Cosmographers* and *Geographers*, I may be bold to recommend it for the best of that kind yet extant in our Native *Tongue*.

The Heads of the respective Things in the several Chapters of VARENIUS, *with the Folio's where Treated of.*

In the First Part, being the ABSOLUTE, or COMPLEAT PART.

Chapter 1.——*Folio* 1.

COncerning the *Precognita's*, or things known before the handling the *Art* it self; as the *Definition*, *Division*, *Object*, *Properties*, *Principles*, *Order*, *Method*, *Original*, *Excellency*, and other Affections of *Geography*.

Chap. 2.——*Fol.* 6.

TReats of certain things taken out of *Geometry*, and *Trigonometry*, necessary to be known in *Geography*.

Chap. 3.——*Folio* 11.

COncerning the Figure of the *Earth*.

Chap. 4.——*Folio* 15.

COncerning the *Dimension* and *Magnitude* of the *Earth*.

A *Table* of the Quantity of one *Degree* in every *Parallel*; or the *Degrees* in which the *Parallels* are distant from the *Æquator*, or the *Elevation* of the *Poles* of the *Parallels*.

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Chap.5.——*Folio* 23.

THe *Motions* of the *Earth*, according to the Opinion of the *Pythagoreans*, *Ptolomaians*, and *Copernicans*, with some others.

Chap.6.——*Folio* 27.

COncerning the *Situation*, or place of the *Earth*, in respect of the *Planets* and *Stars*.

Chap.7.——*Folio* 30.

COncerning the *Substance* and *Constitution* of the *EARTH*; declaring of what Simple and Simular Bodies it may consist, or be compounded of. That it is divided into Dry and Moist parts, *viz. Earth* and *Water*, and how they hold, or cleave together, making the *Land*, whose *Superficies*, or *Surface*, is continual, but that of the *Water* is not so. That the sticking or cleaving fast together of the *Earth* is occasioned from *Salt*. That the kinds of *Earths* are divers ways mixed together in the *Earth*; And that the *Cavities* of the *Earth*, and the outward Disposition thereof, are not always the same.

Chap.8.——*Folio* 35.

TReats concerning the Natural division of the *Parts* of the *EARTH*, made from the *Ocean* flowing round about it; as *Islands*, both great and small, *Peninsula's*, and *Isthmusses*.

Chap.9.——*Folio* 40.

OF *MOUNTAINS* and *HILLS*, in General, and how to find the height thereof; also the Height being known, to find the distance thereof from us. The length of the *Shadow* that a *Mountain* casts, with the height of the *Sun* to that time being given, to find the *Altitude* of the said *Mountain*. Why Showers of *Rain*, *Mists*, and *Snows*, are frequent on the Tops of *Mountains*, when as in the *Valleys* the Air is serene and calm without any such *Meteors*.

Chap. 10.——*Folio* 46.

TReats of the *Differences*, and tract of *MOUNTAINS*, and in Particular concerning the most famous *Chains* or *Cliffs* of *Mountains*; also those famous for their great *Altitude*; and for their burning and casting forth *Flames*. That *Mountains* that run forth in a narrow Neck into the *Sea*, are called *Promontories*. Of *Caves*, and deep *Abysses*, that are in some parts of the *Earth*.

Chap. 11.——*Folio* 54.

OF *Mines*, *Woods*, and *Desarts*.

Chap. 12.——*Folio* 57.

TReats of the *Division* of the *OCEAN* throughout the *Earth*. That the *Ocean* is a continued Tract, encompassing the *Earth*, and the *Terrestrial Parts*; that the *Ocean* may be divided into three kinds, *viz. Ocean*, or *Seas*, *Bays*, or *Gulphs* and *Streights*, the chiefest of which are taken notice of.

Chap. 13.——*Folio* 65.

TReats of some properties of the *Ocean*, and its part. That the *Superficies* of the *Ocean*, and all *Liquid Bodies* are round, *Spherical*, or else in part of a *Spherical Superficies*, whose *Center* is the same with that of the *Land*. That the *Ocean* is not of a greater height than the *Shoars* of the *Earth*, so that the *Earth* and *Water* are almost of the same *Altitude*, high *Mountains* excepted. The reason why the *Sea*, being beheld from the *Shoar*, seemeth to arise in a greater *Altitude* and *Tumor*, by how much it is more remote. The cause and original of *Gulphs*, *Bays*, and *Streights*. Whether the *Ocean* be every where of the same *Altitude*. That the depth of the *Ocean* in most parts may be founded That the *Ocean* hath no *Fountains*, but is contained within the Cavities of the *Earth*. That the *Saltness* of the *Waters* proceed form the particles of *Salt* mixed with it. Whether that *Water* be the fresher in the *Ocean*, by how much it is nigher the bottom, and why in some parts fresh Water is found in the bottom. That the *Water* is less *Salt* nearer the *Poles*, and more *Salt* the nearer to the *Æquator*. The reason why *Rain-Water* in the middle of the *Sea* is found sweet, but the *Water* separated from the *Salt-Water* is yet found *Salt*; when as the *Rain Water* proceedeth from the *Vapours* exhaled from the *Sea*. That *Sea-Water* is more ponderous than *Fresh*; and the *Water* of one *Sea*, is more heavy than of another. That *Salt-Water* doth not so soon *freez* as *Fresh*. Why the *Ocean* is not bigger, seeing that it receives so many *Rivers*. That certain parts of the *Ocean* differ in Colour. That certain peculiar things are found in certain parts of the *Ocean*. That the *Ocean*, or rather all *Water* casts out *Terrestrial Bodies* on the *Shoar*, especially in the *Full Moon*.

Chap. 14.——*Folio* 83.

TReats of the *MOTION* of the *SEA* in general, and in particular of the *Flux* and *Reflux*; shewing what *Water* hath no natural *Motion*, except one, by which it moveth from a more higher place unto those more low; but if the vicine place or Body be equal, or of a greater *Altitude* than the *Superficies* of the *Water*, then the *Water* naturally resteth, that is, being without *Motion*, except compelled by a violent Cause. That when part of the *Ocean* is moved, the whole is likewise so; but by so much the more, that every one is nearer the part moved. That the Quarter into which the *Sea* that is moved tendeth, is to be observed. The *Motion* of the *Sea*, is either *Direct*, or a *Vortex*, or a *Concussion*. That *Wind* is the cause of the contingent cause of the *Sea*, forcing the *Sea* to a quarter, opposite to the *Wind*, nor is the *Sea* ever free from such *Motions*; this *Motion* of the *Sea* is twofold, the one continually from *East* to *West*; the other composed of two contrary *Motions*, termed the *Flux*, and *Reflux*, in which the *Sea* floweth at certain Hours, to the *Shoar*, and at others back again: But the *Winds* oft-times change the general *Motion* of the *Sea*, especially those Fixed *Winds*. That the cause of the general *Motion*, from *East* to *West*, is uncertain; and that the *Flux* and *Reflux*, in which the *Sea* in the space of about 12 ½ Hours Floweth unto most *Coasts*, and so Floweth back again, is when the *Moon* approacheth, to the lowest *Meridian*, and reflloweth when the *Moon* receedeth from the *Meridian*, towards the *West*, and towards the *East*; and the reason thereof. In Full and New *Moons*, the general *Motion* of the *Sea*, from *East* to *West*, is more violent; also the intumescency of the *Sea*, is found great in most parts; Also in the *Vernal* and *Autumnal Equinox*, the intumescency of the *Sea*, is greater than in other *Seasons*, but least in the *Solstices*. That in some parts of the *Ocean*, as *Gulphs* and *Shoars*, the encrease and decrease of the *Water* in the *Influx*, and *Defluxe* is great; in other parts it is very small, and in some not discernable. That in those places of the *Sea*, to which the *Moon* is *Vertical*, the *Flux* and *Reflux* is greatest, except impediments. That the quantity of the *Flux*, and *Reflux* is inconstant in every place, and divers on several Days, and by so much the greater or lesser, by how much the *Moon* is more remote, or nearer to the place. The variety of peculiar, or proper *Motions* of the *Sea*, in which a certain part of the *Ocean* is either moved perpetually, or in some certain Months is great and considerable. Now unto the special perpetual *Motions* of the parts of the *Ocean* also these do pertain, caused by great *Rivers* discharging themselves therein. That the *Motion* of the *Sea* termed a *Concussion*, or *Trembling*, is caused from a Spiration of *Wind*, which moveth the *Earth*, or *Water* it self, causing it to rise. The reason why the *Pacifick Ocean* is more Calm, and without great *Floods* or *Waters*, and the reason it is easily moved, and rough with a *Wind*.

Chap. 15.——*Folio* 102.

TReats of *LAKES*, *POOLS*, *MARISHES*, and the like, standing *Waters*; giving an Account thereof, and the reasons why some neither send forth, nor receive *Rivers*; of others that receive *Rivers*, but let out none; and others that both receive and let out *Rivers*. That many *Lakes* contain Fresh *Water*, and but few *Salt*. That *Marishes* have a *Sulphurous*, *Bituminous Earth* in them.

Chap. 16.——*Folio* 108.

TReats of *RIVERS* in General. That *Torrents* and *Rivulets* sometimes proceed from a quantity of *Rain*, and dissolved *Snow*. That most *Rivers* proceed from *Fountains*; but great *Rivers* have their original, either from the Congress of many *Rivulets*, and small *Rivers*; or flow from *Lakes* and *Marishes*. That *Rivers* are very much augmented by frequent *Rains*, and dissolved *Snow*, and that in divers *Seasons* and *Months* of the *Year*. From whence *Rivers* are generated; and what may be the Original of that *Water* which floweth from *Springs*. That certain *Rivers* hide themselves in the midst of their passage under the *Earth*, and in another place rise up again, as it were new *Rivers*; and all *Rivers* do discharge themselves into the *Sea*, or else the one into the other, which at last emptieth it self into the *Sea*. The reason why no *Salt-Water Rivers* are found, seeing that *Salt Springs* are found in many places. The reason why *Rivers* have, or acquire a greater *Latitude* in one part of them, than in another; and why some run with a more swift Current, and others with a more flow. Also why one *River* is carried with a swift Current in once place, and a flow in another. That most *Rivers* have their Course in divers windings. The *Water* of *Rivers* carrieth with it many particles of various *Metals*, *Minerals*, *Sands*, and *Oily*, *fat Bodies*; and that the *Waters* of most *Rivers* differ in colour, gravity and other qualities. That some *Rivers* at a certain time every Year, are so augmented, that they over flow the adjacent *Lands*. The Reason how *Springs* and *Fountains* break forth. *Rules* to know if a *Spring* or *Well* may be made there, and to know if the *Water* is good. That *Whirlpools* are found in the *Channels* of some *Rivers*. That *River-Water* is more light than that of the *Sea*.

Chap. 17.——*Folio* 130.

TReats of *MINERAL WATERS*, *BATHS*, and *SPAWS*. That no *Water* is pure, and elementary, but contains, or hath mixed Particles, such as are found in *Terrestrial Bodies*, as Oyls, Spirits, and the like. The reason how *Mineral Waters* are generated; for there are innumerable kinds of these *Waters*, according to the variety and diversity of the *Particles* which they contain of divers *Minerals*; some being *acid* or *sour*, others *hot*, as *Baths*, others *fat* and *Oily*, others *bitter*, others *cold*, others *Poysonous*, and others *Salt*.

Chap. 18.——*Folio* 142.

TReats of the mutations, of the Places of the *Water*, and *Land*, or of the mutations of *Watery Superficies* into the *Earthly*, or the contrary. To know the *Superficies* of the *Earth*, which the *Water* possesseth, how great it is, and that which the *Earth* occupieth. That the *Superficies* of the *Water*, as also of the *Land* is not at

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at all times of the same *Magnitude*, but sometimes greater, and sometimes lesser; and that when one augmenteth, the other diminisheth. The *Water* may leave the *Shoar* for divers causes, and become dry Ground; likewise *Rivers* leave their *Channel*, or *Shoar*, and afford new *Land*; *Lakes* are also dried up, and become *Land*; *Streights* are exsiccated, and changed into *Isthmusses* or *Continents*; and *Bays*, or *Gulphs*, in course of time become dry places. The generation of *Sandy-Banks* in the *Sea*, and elsewhere. *Islands* are produced in the *Sea*, and *Rivers*, after the same Mode that *Sand-Banks* are: yet *Islands* may proceed from *Sand-Banks*, although made after another Mode. That the *Ocean* now possesseth part of the *Land* which formerly it did not. The reason why in the middle of the *Ocean* no *Islands* are found.

Chap. 19. —— *Folio* 154.

TReats of the *ATMOSPHÆRE* and *AIR*. That from the Parts of the *Earth*, as well Dry as Moist, or from the *Earth* and *Water*, Vapours and Fumes do continually exhale into that Space which is about the *Earth*. The *Atmosphære* is a Space about the whole *Earth*, in which the Exhalations raised from the *Earth* are always present; and it is uncertain whether any Thing or Body else be contained in it, besides these *Exhalations*; and sometimes more, sometimes less *Exhalations* are drawn from the *Earth*, especially in divers places. The *Exhalations* which constitute the *Atmosphære* are of divers kinds (especially in sundry *Regions*) *viz. Waters*, *Salrish*, *Earthy*, *Sulphurous*, and *Spirituous*. The least *Particles* of the *Air*, and those all insensible repel and reflect the *Rays*, as a *Looking-Glass*; but some of the *Particles* of the *Air* being sensible and compounded, do transmit many *Rays*, but reflect fewer; others (on the contrary) transmit fewer *Rays*, and reflect more. *Exhalations* do not ascend of themselves, and of their own nature upwards, but are forced by a violent Motion; or the *Air* is not light but heavy, in a proper Mode of Expression. The upper parts of the *Atmosphære* are more subtile than the lower, yet it may so come to pass, that the middle parts may be more gross and condensed, than the lower parts about the *Earth*. The *Atmosphære*, or *Air*, being heated, possesseth more Space than before. Instructions to make a *Thermometer*, *Thermoscope*, or *Weather-Glass*, to discover the Mutations of the *Air* in Heat and Cold. The serene *Air* may be so carried by a most vehement Fire, that it may occupy a Space 70 times greater than it did before: on the contrary, it may be so condensed in a *Wind-Gun*, that it may only possess a 60*th* part of the former Space; but the heat of the *Sun* bringeth not so great a Rarification, or the cold so great a Condensation to the *Air*. The reason why the places in the *Frigid Zone*, at the time in which the *Sun* ariseth not altogether unto them, on some days the *Air* is serene, but for the most part foggy. Whether the *Altitude* of the *Atmosphære* above the *Earth*, be the same in all places at one and the same time, and whether its *Figure* be *Spherical*. That *Condensations*, or *Rarefaction* of *Air* changeth not its *Altitude*. By how much the *Air* is the more cold, by so much the more it is condensed; and therefore the more condensed in the *Winter*. By how much that place of the Earth unto which the *Sun* is *vertical* receedeth to the *Pole*, by so much the less distant the place of the *Air* is from the *Earth*, in which the *Rain*, *Snow*, and *Hail* begin to be generated. The *Atmosphære*, or *Air*, causeth the *Sun*, or the rest of the *Stars* and *Planets* to be seen before they arise in the *Horizon*, also to appear higher than they are. By how much the *Air* is thicker, by so much the more the *Star* is depressed beneath the *Horizon*, when it first begins to appear; and by how much the *Air* is lower, by so much the *Star* is the more depressed beneath the *Horizon*. The reflection of the Rays of the *Sun* from the Particles of the *Air* is the chief cause of the *Twilight*, that is, of the Light before the rising, and after the setting of the *Sun*; from which *Twilight* the *Altitude* of the *Air* may be found. To find the *Altitude* of the *Clouds* by a *Geodetical* dimension. That the *Air* in some places hath some things peculiar.

Chap. 20. —— *Folio* 179.

TReats of the *WINDS* in general, and the *QUARTERS* of the *WORLD*. The *Wind* is a commotion of the *Air*, sensible by touch, or with some force. Most *Winds* tend from one *Quarter* to the opposite *Quarter*, and force Bodies with them. A *Quarter* is an imaginary Point, extended from any place of the *Earth* perpendicularly, towards one Point of those which circularly stand about that place. These *Quarters* are infinite in number, seeing that *Plains* may be drawn through every Point of the *Horizon*, but 32 only have Names ascribed to them; which said 32 *Points* or *Quarters* are equally distant one from another. The causes of the *Winds* are various; for seeing that the *Wind* is nothing but a continued protraction of the *Air*, all those things that are able to effect such a protrusion will be the cause of *Winds*. Why the *Winds* blow by an interrupted force, so that sometimes they cease, and at other times (as it were) with redoubled strength, they return with the greater importunity; and the reason that they seem more continually to blow on the *Sea*, so that it is discovered less calm. The reason that *Westerly-Winds* are less frequent than *Easterly*; and the *Northern* and *Eastern Winds* are more impetuous and stormy, and on the contrary the *Southern* and *Western* more calm: Also why the *Southern* and *Western Winds* are more hot than those of the *North*, or *East*. Why from the sight of a *Cloud* of a pale and duskish colour, a *Wind* proceeds from that Quarter. Why in the *Spring* and *Autumn* the *Winds* are more frequent, and stronger than in the hot *Summer*, or cold *Winter*. Unto what Space one and the same *Wind* may extend it self.

Chap.

Chap. 21. —— *Folio* 187.

TReats of the *WINDS* in particular, and of *TEMPESTS*. That one *Wind* is constant, and another inconstant; one *Wind* is general, and another particular. Some *Winds* are *Periodical* and fixed, others wandring and *Erratick*. Of the most noted *Winds*: The *Etesian Winds*, that are Anniversary in *Greece*, proceed from *Rain* and *Snow* dissolved on the *Mountains*. Some *Winds* are proper, and almost perpetual to some place, others are ceasing. Unto the *Periodical*, or *State-Winds*, appertain those also termed *Day-Winds*, which in some Regions, and at a certain time of the Year blow for some hours every day. By how much you draw near the *Æquator* from the *Artick-Pole*, by so much the *North-Winds* are found to be less vigorous; and having past the *Æquator* in part of the South Continent *Southern Winds* are vigorous, which in these places are cold and dry. There are differences of *Winds*, some are sudden, impetuous, and violent, not continuing long; An *Exhydrias*, is a Wind breaking from a *Cloud* with great abundance of Water; A *Typhon*, is a violent Wind passing swiftly through all the Quarters about a place, and for the most part rushing from the top. Whether that a certain *Wind* may arise from the flowing of the *Sea*, and of the *Rivers*. Why *Ignes-fatui*, *Castor*, and *Pollux*, and *Helena*, are amongst *Tempests*. Why there is so frequent a *Calm* in the *Sea* near *Guiny*, and under the *Æquator*, in the *Atlantick Ocean*, between *America* and *Africa*. That in some *Regions* the *Tempests* are Anniversary.

In the Second Part, being GENERAL GEOGRAPHY. Treats of the Affections of the Places of the Earth, depending on the apparent Motion of the Stars.

Chap. 22. —— *Folio* 203.

TReats of Things necessary to be foreknown in *Geography*.

Chap. 23. —— *Folio* 207.

OF the *LATITUDE* of *Places*, and the Elevation of the *Pole*. Shewing, that the *Latitude* of a place in the Superficies of the *Earth* is the distance of the same from the *Æquator*. That the *Elevation* of the *Pole* of any place, or above the *Horizon* of any place, is called the *Arch* of the *Cœlestial Meridian* of that place intercepted between one and the other *Cœlestial Pole*, and the *Horizon* of that place. The place being given in the Superficies of the *Globe*, so to constitute the *Globe*, that the *Wooden Horizon* may be the *Horizon* of that place. A place being given in the Superficies of the *Globe*, or the *Latitude* of any place being given, to shew all the places of the *Earth*, which may have the same *Latitude*, or *Distance* from the *Æquator*, or *Elevation* of the *Pole*; or to find all the places of the *Earth*, which may have the distance given from the *Æquator*. How to find the *Meridian*, and Point of the *North* and *South* in the given place of the Earth. To place a *Globe*, so that the *Cardines* of the same, may respect the *Cardines* of the *Earth*, that is, that the *Brazen Meridian* may be seated in the true *Meridian* of the Place. To find the *Latitude* of the place from the *Heaven*, or the Elevation of the *Pole* above the *Horizon* of any place by the benefit of the *Stars*. The places of the *Earth* (under the *Æquator*) have no *Latitude*, but both *Poles* lye in their *Horizon*. The places under the *Poles* have the *Latitude* of 90 *Degrees*; *viz.* the *Pole* in the *Vertex*, and the *Æquator* in the *Horizon*. The places between the *Poles* and the *Æquator*, have a less *Latitude* than 90 *Degrees*.

Chap. 24. —— *Folio* 213.

TReats of the *Division* of the *Earth* into *ZONES*; and the *Cœlestial Appearances* in the divers *Zones*; Shewing, that from the proper or Annual Motion of the *Sun*, there ariseth a certain Division of the Superficies of the *Earth* into five *Zones*, as already treated of; and that the *Æquator* of the *Earth* passeth through these places there taken notice of. In the places that lye in the *Tropicks*, the *Sun* once a *Year* is only vertical on the *Meridies*, or *Noonstead*; but in places under the *Torrid Zone* he is *vertical* twice a *Year*, *viz.* two Days, which are equally distant from the longest Day. But in places without the *Torrid Zone*, and seated without the *Tropicks*, the *Sun* never in any Day of the Year is *vertical*. To *Places* seated in either of the *Frigid Zones*, the *Sun* every Year (some *Day* or other) setteth not, and so many *Days* riseth not; and that so many *Days* the more, by how much those *Days* are nigh the *Poles*; so that in a whole place of the *Pole* for six Months it setteth not, and riseth not to another. But in places in the *Artick* and *Antartick Circle* the *Sun* setteth not one Day in the Year, and one Day riseth not; but other Days it sets and riseth. That in *Places* seated without the *Frigid Zone*, that is, in the *Temperate*, or *Torrid Zones*, the *Sun* every Day riseth and setteth.

Chap. 25. —— *Folio* 220.

TReats of the *LONGITUDE* of the Days in divers places of the *Earth*; and of the Division of the *Earth* into *Climates*, which proceed from them. That in two Days of the *Year* are the *Æquinoxes*, or the *Night* is equal to the *Day* in all places of the *Earth*. In places seated in the *Æquator*, the *Days* and *Nights* are always equal: In the places of the *Poles* there is only one Day and one Night in the whole Year: Now the Day is longer than the Night in

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the *North Pole*, and in the *South Pole*, the *Day* is shorther than the *Night*. In places lying beneath the *Æquator*, and the *Pole*, no *Days* are equal to the *Nights*, except the two *Days* of the *Æquinoctial*, all the reſt being either greater, or leſſer than the *Nights*. In all places ſeated between the *Æquator*, and the *Pole Artick*, the longeſt *Day* and ſhorteſt *Night*, is when the *Sun* enters the firſt *Degree* of *Cancer*; and the ſhorteſt *Day* and longeſt *Night*, is when the *Sun* enters the firſt *Degree* of *Capricorn*; but in the places ſeated between the *Æquator* and the *Antartick Pole*, it is juſt contrary; And whilſt the *Sun* in the *Northern* Places, moveth from the firſt *Degree* of *Capricorn*, to the firſt of *Cancer*, the *Days* encreaſe; and whilſt he moveth from the firſt of *Cancer*, to the firſt of *Capricorn*, decreaſeth; but in *Northern* Places quite contrary, encreaſing from the firſt of *Cancer* to the firſt of *Capricorn*, and decreaſing from the firſt of *Capricorn* to the firſt of *Cancer*. All places of the *Earth*, ſeated in one and the ſame *Parallel* have all the *Days* of the Year equal, and therefore the ſame quantity of the longeſt *Day*. If more places of the *Earth*, be taken from the *Æquator* towards the *Pole*, whoſe diſtance from the *Æquator* equally augmenteth from one *Degree* to, 10, 20, 30, or 40, the longeſt *Days* in theſe places ſhall not be equally greater, or not equally augment; but they ſhall more augment in places more remote, and where the place is more near the *Pole*. How to compoſe a *Table* of the *Climates*, with a *Table* thereof, and its uſe.

Chap. 26.——*Folio* 231.

TReats of the *LIGHT*, *HEAT*, *COLD*, and *RAINS*, in divers parts of the *Earth*, or *Zones*, with other Properties of the *Zones*, as the *Seaſons* of the Year, and the reaſon thereof. That in the places in the *Temperate* and *frigid Zones*, the Seaſons of the Year, are almoſt equal, conſiſting of an equal number of Days; But in the places of the *Torrid Zone*, they are unequal. In places of the *Torrid Zone*, as the *Sun* by *Day* is very near the *Vertex*, ſo on the contrary by Night he is beneath the *Horizon*, and very much removed from the *Vertex* of thoſe places; ſo that thoſe places by Night, lie almoſt in the middle *Shadow* of the *Earth*; neither can the *Air* poſſibly any ways be warmed by the *Suns Rays* by frequent reflection. In places of the *Frigid Zone* as the *Sun* by *Day* is not very nigh the *Vertex*, ſo by Night he doth not profoundly remain beneath the *Horizon*; but for the greateſt part of the Night doth ſo turn round beneath the *Horizon*, that many *Rays* from him by reflection do penetrate into the *Air*. And in places in the *Temperate Zone*, as the *Sun* by *Day* cometh to the *Vertex*, of thoſe places by a moderate vicinity, ſo by Night by an eaſy diſtance he is depreſſed beneath the *Horizon*; ſo that ſome *Rays* at leaſt are in the *Air*. In Places of the *Torrid Zone* the *Twilights* are ſmall, very long in thoſe of the *Frigid*, and moderate in thoſe of the *Temperate Zone*. Reaſons given to ſhew how the four *Seaſons* of the Year are made, and behave themſelves, and in what Months of the Year they commence in the divers places of the *Zones*.

Chap. 27.——*Folio* 259.

TReats of the *SHADOWS*, which the *Bodies* erected in the *Earth*, and illuminated by the *Sun* do caſt, and of the Diviſion of the *Earth*, ariſing from thence. That *Shadows* of *Bodies*, erected above the *Horizontal Plain*, fall upon the Quarter oppoſite to it, in which the *Sun* exiſteth. In places ſeated in the *Æquator* the *Meridian Shadow* falls half the Year towards the North, the other half towards the South. In the places ſeated in the *Æquator*, the Shaddow of the Stile perpendicularly erected in the whole Days of the *Æquinoxes*, remains in one right *Line*, whether before *Noon*, it be continually caſt into one Quarter of the Weſt, or after *Noon* into a Quarter of the Eaſt; Now in the other Days of the Year the *Shadow* is carried round into the *Semicircle*. The *Longitude* of the *Shadows* decreaſeth, the *Altitude* of the *Sun* increaſing; and on the contrary the *Altitude* of the *Sun* decreaſing, the *Shadow* increaſeth. By how much the places of the *Earth*, every *Day* are more remote from the *Æquator*, or from the *Parallel* of the *Sun*, by ſo much the more, both the *Meridian Shadow* as well as the *Shadows* of the reſt of the Hours, are longer. Directions from the *Æquinoctial NightDyal*, as alſo the *Horizontal Scioterick*, or *Horizontal Plain*.

Chap. 28.——*Folio* 269.

TReats of the *compariſon* of the *CELESTIAL AFFECTIONS*, in divers places of the *Earth*; ſhewing that thoſe who live in the ſame *Semicircle* of the ſame *Meridian*, have alſo the ſame *Merides*, or 12 Hours; and alſo reckon together all the other Hours. Thoſe that dwell in divers *Hemiſpheres* of the *Earth*, which the *Æquator* makes, or thoſe that live in the divers Quarters of the *Æquator*, have contrary *Seaſons* of the Year, at the ſame time, and the ſame *Seaſons* in a different time of the *Tear*; ſo that in one *Hemiſphære* it is *Winter*, when in the other it is *Summer*. Thoſe who live in the *North Hemiſphære* of the *Earth*, when they turn their *Faces* towards the *Æquator*, the *Eaſt* is on their left Hand, and the *Weſt* on the right, the *South* before them, and the *North* behind them: And thoſe that live in the *South Hemiſphære* the *Stars* riſe on their right Hand, and ſet on their left. Thoſe who liye in the ſame *Parallel* of the ſame *Earth*, have every *Day* and *Night* equal; every one of the *Stars* alſo remains an equal time above their *Horizons*, the ſame *Stars* never ſet, the ſame *Stars* never riſe; the *Sun* every *Day*, and alſo all the *Stars* riſe and ſet to them in the ſame *Quarter*; and in the ſame *Hour* alſo the *Stars* are equally elevated above the *Horizon*, or depreſſed beneath it; They have the ſame *Pole* equally elevated; their *Faces* being turned to the *Æquator*, or the ſame *Pole*, the *Stars* riſe to them from the ſame ſide: they have the ſame *Seaſons* of the *Tear*, and at the ſame time, except the ſingular properties of ſome places.

Chap. 29.——*Folio* 272.

TReats of the *Computation* of time in the divers places of the *Earth*, wherein are divers *Queſtions* ſtated, and reſolved, concerning time, or the Hour of the *Day* of ſeveral *Nations*, and places.

Chap. 30.——*Folio* 280.

TReats of the various riſing, ſetting, *Altitude* of the *Sun*, and other appearances in the divers parts of the *Earth*; ſhewing how to place or hang a *Terreſtrial Globe* ſo, that when the *Sun* ſhines, thoſe parts of the *Globe*, may be illuminated which the *Sun* enlightneth in the *Earth*, at any time; and that it alſo may appear, unto what *People* the *Sun* riſeth, and to whom it ſetteth; to whom it makes the *Meridies*, and to whom it is quite abſconded; to what place it is vertical. Alſo to find the place of the *Sun* in the *Ecliptick*, and the *Day* of the *Tear*; Alſo the Hour of the place. That the *Globe* being ſo placed when the *Moon ſhines*, to whom it ariſeth, to whom ſetteth, and to whom vertical. By how much the places of the *Earth*, are remote from the *Parrallel* of the *Sun* on any Day, by ſo much the more the *Sun* is elevated to a leſſer *Altitude* in the ſame *Hours* above their *Horizons*: Alſo by how much the places of the *Earth* are remote from the *Æquator*, or more near the *Pole*, by ſo much the more the Parts of the *Horizon* are diſtant, in which the *Sun* riſeth on the Day of the *Solſtice*, and the Day of the *Winter*; as alſo thoſe in which he ſetteth. The ſame is true concerning the *Moon*, and all the *Planets*. *Stars* placed between the *Parallel* of any place (being without the *Æquator*) and the *Pole*, are leſs elevated above the *Horizon*, of the places between this *Parallel*, and the other *Pole* of thoſe ſituated there, then above the *Horizon* of the places ſeated between the *Parallel*, and the neerer *Pole*. In places ſeated in and near the *Æquator*, the *Sun* and *Stars* directly aſcend above the *Horizon*, even to the *Meridian*, and ſo deſcend again: But in places above the *Æquator* they aſcend and deſcend obliquely; and ſo much the more, by how much the place is more remote from the *Æquator*. By how much the place is more remote from the *Æquator*, by ſo much the more the *Signs* of the *Zodiack*, and other *Conſtellations*, require the greater time to riſe and ſet; and they paſs through the *Meridians* of all places at an equal time, with ſeveral Queſtions laid down, and reſolved, relating to the *Riſing*, *Setting*, and *Altitude* of the *Sun*.

In the Third Part of GENERAL GEOGRAPHY, to wit, the Comparative Part, Treats of the Affections from comparing of Places.

Chap. 31.——*Fol.* 291.

TReats of the *LONGITUDE* of Places. Shewing, that Nature hath put no beginning or end to the Dimenſion of the *Earth*, or of the extenſion from Weſt to Eaſt, or according to the *Æquator*; but all and every one of the Places may be taken for a beginning, and the firſt *Meridian* may be placed in them. The *Latitude* and *Longitude* of any place, or the diſtance of any place from the *Æquator*, or a certain *Meridian* being given, which is found in *Maps*, or *Globes*, to exhibit the *Situation* and Point of that place on the *Maps*, or *Globes*. The *Sun*, *Stars*, and all the *Points* conceived in the *Heavens*, are every *Hour* removed, or recede 15 Degrees from the *Meridian* of any place, in one Scruple of an *Hour*, which is the $\frac{1}{60}$ part, they are removed 15 *Minutes*, and ſo in four *Scruples* they recede one *Degree*. With other Queſtions propoſed, relating to the *Longitude* of Places.

Chap. 32.——*Folio* 309.

TReats of the mutual Situation of *Places*, and compoſition of the *TERRESTRIAL GLOBE*, and *MAPS*; Shewing, that a place being given in the Earth, how to find the Situation of other places at that place. That a Place being given on the *Earth*, or *Globe*, to exhibit all thoſe places, at which the given Place hath ſome one given Situation, or Quarter. Directions to make a *Terreſtrial Globe*; and how to compoſe *Geographical Maps*.

Chap. 33.——*Folio* 335.

TReats of the *Diſtance* of *Places*; Shewing, That two *Points* or *Places* being given on the *Globe*, to draw a *Line* or *Arch* from one to the other, which may be part of the greateſt *Periphery* of the *Globe*; or to deſcribe on the *Superficies* or *Periphery* of the greateſt Circle, which may paſs through the two given Points. That the diſtance of two places on the *Superficies* of the *Earth* is very ſhort, or the ſhorteſt way from one place to the other, is only one (except the places of the *Antipodes*) *viz.* the *Arch* of the greateſt *Periphery*, which is intercepted between thoſe two places. The *Diſtances* of Places are not changed. No *Maps* of the *Earth* are diſtant a greater Interval than 2700 *German Miles*, whereof 15 are ſaid to be a *Degree*; for the Diſtance of the *Antipodes* is 2700 *German Miles*, or 180 *Degrees*. The reaſon why the Itinerary Diſtance is greater than the true, or ſhort and *Geographical*. The *Latitude* and *Longitude*

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gitude of two places being given, to find their Distance.

Chap. 34. ——— *Folio* 342.

TReats of the *Visible* and *Sensible HORIZON*. That the Stature of a *Man* being given from the *Foot* to the *Eye*, and the *Semidiameter* of the *Earth* being given, to find out the *Semidiameter* of the *Sensible Horizon*. The *Altitude* of the *Eye* being given on a *Tower*, or *Mountain*, to find the Distance of the last point unto which the *Eye* extends it self, or which the *Eye* can see. The *Altitude* of the *Eye* being given, and of some erected seen *Magnitude*, as a *Tower*, *Mountain*, or the *Mast* of a *Ship*, to find the Distance thereof from that of the *Eye*. The Refraction of *Rays* in the *Air*, augmenteth the apparent *Semidiameter* of the *Sensible Horizon*.

Chap. 35. ——— *Folio* 342.

TReats of the three Parts of the Art of *Navigation*, to wit, the Building of *Ships*, *Lading* them, and guiding or *Navigating* them from *Port* to *Port*. And this concludes the first Part, *viz.* of *Varenius's Cosmography*, and *Geography*.

The Second Part, to wit, SANSONS *GEOGRAPHY, viz. Special Geography, Treats of these following Heads.*

THe Subject of *Special Geography*, is to describe the *Limits* and *Circumscription* of *Countreys*, with their *Latitudes*, *Longitudes*, and *Situation* of *Places*; their *Mountains*, *Vallies*, *Woods*, *Desarts*, *Forests*; describing their *Appellation*, *Situation*, &c. their *Properties*, with the things contained in them, as *Mines*, *Minerals*, &c. Their *Waters*, as the *Sea*, *Lakes*, *Rivers*, and *Marshes*; shewing their *Springs*, *Inlets*, *Trails*, *Cataracts*, with the quality and nature thereof; their *Capes*, *Bays*, *Sea-Ports*, *Cities*, *Towns*, &c. Their *Fertility*, *Sterility*, and *Soil*. Their *Fruits*, *Cattle*, *Fowl*, *Fish*, and *Insects*; Their *Inhabitants*, as to their *Original*, their *Stature*, *Life*, *Meat*, *Drink*, and *Habits*; Their *Customs*, relating to *Marriages*, *Children*, *Funerals*, *Laws*, *Religions*, *Government*; Their *Language* or *Speech*; Their *Arts*, *Manufactures*, *Commodities*, and *Traffick*; Their *Military Discipline*, *Force*, and *Arms*; Their *Vertues* and *Vices*, *Genius* and *Erudition*; Their Memorable *Historics*, with their Famous *Men* and *Women*, *Artificers*, *Inventions*, &c.

These and the like Heads, being the Subject of *Special Geography*, being too capacious to be handled in this small Tract, are thought fit rather to be omitted than to be only glanced upon; so that I refer the *Reader* to the above-said *Book*, as also to other famous *Geographers*; and so conclude with some necessary and useful *Tables*.

The

The *Earth* is divided into *Land*, and *Waters*. The Superficies of the *Earth* extant out of the *Water* by the Interflux of the *Sea*, is distinguished into these four parts, *viz.*

1. Into great *Continents* or great *Islands*, of which four are reckoned by us.
   - 1. The Old World; whose parts are *Europe*, *Asia*, and *Africa*. The Bounds of this Continent are: On the North, the *Frozen* and *Tartarian* Ocean. On the East, the *Pacifick* and *Indian* Ocean. On the South, the Southern Ocean. On the West the *Atlantick* Ocean.
   - 2. The New World, or *America*, whose parts are *Meridionalis*, *Septentrionalis*. The bounds of it are: On the North, *Davis Streights*. On the East, the *Atlantick* Ocean. On the South, the *Pacifick* Ocean. On the West, the *Streights* of *Magellan*.
   - 3. The Polary North-land, or *Greenland*, is every were encompassed by the Sea and *Streights*.
   - 4. The South-land, and Land of *Magellen*, yet undiscovered.
2. Into *Peninsuals*, or *Chersonesus*, which are parts of those Continents,
   - Round, whose Latitude and Longitude are equal about: *Africa* it self. *Peloponesus*, the *Chersonesus* of *Grecia*. *Chersonesus Taurica*, or *Tartaria Precopensis*. *Cambaja*.
   - Long, among which are: The *Chersonesus* of *Malacca*, adjoyning to *India*. *Cimbrica* or *Jutland*, adhering to *Holsatia*. *Borea* adjoyning to *Tartaria*. The North and South parts of *America*. *California*. *Jucatan*. The *Chersonesus* of *Thracia*. *Nova Francia*. *Ionia*, *Cindensis*, *Mindensis*.
   - Of Affinity to *Peninsulas*: *Italy*, *Greece*, *Acaia*, *Spain*, *Norway*, *Sweden*, *Lapland*, *Asia minor*, *Arabia*, *Beach* a Region of *Magellan*, and *New Guiney*, *Indostan*, *Cochinchina*, *New-England*, *Monomotapa*, *Camboia*.
3. *Islands*, which may be considered in four sorts, *viz.*
   - Great, as: *England*, *Japan*, *Island*, *Canada*, *Sumatra*, *Madagascar*, *Borneo*, *Nova Zembla*, *California*.
   - Indifferent, as: *Sicilia*, *Ireland*, *Hispaniola*, *Cuba*, *Java Major*, *Celebes*, *Creet*, *Luconia*, *Sardinia*, *Friesland*, *Terra Nova*, *Mindanoa*, *Ceilan*.
   - Small, as: *Gilolo*, *Amboina*, *Timor*, *Corsica*, *Majorca*, *Cyprus*, *Negropont*, *Sealand*, *Jamaica*.
   - The very small ones, in which we consider: 1. The more famous, *Solitaria*, *Rhodes*, *Malta*, *Lemnos*, *Helena*, St. *Thomas*. 2. A knot, or heap of *Isles* together, as: The *Canary Isles*. The *Flandrian* or *Caribbe Isles*. The *Hesperides*. Those of the *Gulph* of *Mexico*. Of *Maldives*. Of *Japan*. About *Madagascar*. The *Molluccos* & *Isles* of *Banda*. The *Philippine Isles*. The *Isles* of *Theeves*. The *Isles* in the *Ægean Sea*. The *Isles* about *England*. The *Isles* of *Solomon*.
4. The *Isthmusses*: Between *Egypt* and *Arabia*, or *Africa* and *Asia*. That of *Corinth* between *Peloponesus* and *Achaia*. The *Isthmus* of *Panama* or *America* the longest of all. Between *Jutland* and *Holsatia*. Between *Malacca* and *India*.

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On, or above the Surface of the Terreſtrial Globe, and Maps of the World, ought to be underſtood and noted,

- Ten Points; of which
  - Four are called Cardinal Points, as — the North, or the Pole Arctick, / the South, or the Pole Antarctick, / the Eaſt. / the Weſt.
  - Four are called Collateral Points, as — the Eaſt of the Summer, / the Eaſt of the Winter, / the Weſt of the Summer, / the Weſt of the Winter.
  - And two, as above and Under us; as — the Zenith, / the Nadir.
- Ten Circles, or Lines, of which
  - Five are Parallels, one to the other, as — the Æquinoctial, or the Equator. / the two Tropicks, as — the Tropick of Cancer, / the Tropick of Capricorn. / The two Polar Circles, as — the circle of the Pole Arctick, / the circle of the Pole Antarctick.
  - Five others are different one from the other, as — in the middle of the Zodiack, as — the Ecliptick. / the Horizon, as — the Horizon rational, / the Horizon ſenſible, or viſible. / the Parallels, or — the Degrees of Latitude. / the Meridians, or — the Degrees of Longitude.
- Two Colures, in which are 4 Points, which note
  - our four Seaſons of the year, to wit, above — the colures of the Æquinoxes, as — the Spring. / the Autumn. / the colures of the Solſtices, as — the Summer, / the Winter.
- Three ſorts of Zones, in which are five, to wit
  - one Torrid, or — the Parching.
  - two Temperate, as — the temperate Arctick, or Northerly, / the temperate Antarctick, or Southerly.
  - two Frozen, or Cold, as — the frozen Arctick, or Northerly, / the frozen Antarctick or Southerly.
- Three ſorts of Shadows,
  - which diverſly receive the Inhabitants of the five Zones; for they are
    - in the Torrid Zone — Umbrati.
    - in the Temperate Zones — Northerly, — Northern Heteroſcians. / Southerly, — Southern Heteroſcians.
    - in the Frozen Zones — Northerly, — Northern Periſcians. / Southerly, — Southern Periſcians.
- 2 ſorts of Poſitions, as
  - the Inhabitants about the ſame Parallel, oppoſite in Meridian, are — Perioeci. / Antœci.
  - the Inhabitants about one Meridian, oppoſed in their Parallels, are — Antipodes.
  - the Inhabitants oppoſed both in Meridians, and in Parallels, are — dia (that is, through) Meroes, / dia Sienes, / dia Alexandrias, / dia Rhodou, / dia Fonsou, / dia Boriſtenou. / dia Ripheon, / dia Danias.
- The Climates; of which
  - the Ancients firſt made ſeven — which they call by the moſt famous Places, Seas, and Rivers, by which they paſſed; as
  - then nine, in adding
- The Parallels; which are
  - the Moderns made 10, to wit — between the Æquator and the Polar Circle — 24, by half Hours. / between the Polar Circle, and the Pole — 6, by Months.
  - following the Ancients 14, — between the Æquator and Polar Circle — 24, by Quarters of Hours.
  - following the Moderns 20, — between the Polar Circle and the Pole — 12, by Fourteen Days.
- The Winds; whereof the
  - 4 Firſts, and whereof the names are Monoſyllables, ſhall be called — Cardinal Winds, as — North. / South. / Eaſt. / Weſt.
  - 4 Seconds, whereof the names are of two ſyllables, and compoſed of two of the four Firſts, ſhall be called — Collateral Winds, as — North-Eaſt. / North-Weſt. / South-Eaſt. / South-Weſt.
  - 8 Thirds; and have their names of three ſyllables, compoſed of one of the four Firſt, and of one of the four Seconds, as — North North-Eaſt. / North North-Weſt. / South South-Eaſt. / South South-Weſt. / Eaſt North-Eaſt. / Eaſt South-Weſt. / Weſt North-weſt. / Weſt South-weſt.
  - 16 Fourths; taking their names from four Firſts, or four Seconds, in ſaying of one fourth part by the other, and that without having regard to the eight Third Winds, &c. as it were — North and a quarter by North eaſt. / North-eaſt and a quarter by North. / North, and a quarter by North-weſt. / North-weſt, and a quarter by North. / South, and a quarter by South-eaſt. / South-eaſt, and a quarter by South. / South-weſt, and a quarter by South. / Eaſt, and a quarter by North-eaſt. / Eaſt, and a quarter by South-eaſt. / Weſt, and a quarter by North-weſt. / Weſt, and a quarter by South-weſt. / North-weſt, and a quarter by weſt. / South-weſt, and a quarter by weſt.
- The Meaſures; in which are to be conſidered, that
  - the leaſt part that can be deſcribed upon the Terreſtrial Globe, is — a Point.
  - three Points, deſcribed and continued right the one to the other, make — a Line.
  - twelve Lines, continued together, are eſteemed to make — an Inch; or Thumbs breadth.
  - twelve Inches, make — a Foot.
  - two Paces and half make a common Pace, and two common Paces — a Geometrical Pace.
  - one hundred ſeventy five Geometrical Paces, make — a Stadio, or certain meaſure of ground.
  - eight Stadia, of one thouſand Geometrical Paces, in — one thouſand Roman Paces, or the Italian Mile
  - one thouſand, five hundred Geometrical Paces make — an Engliſh Mile.
  - one thouſand, two hundred ſixty ſeven Paces make — a Scotch Mile.
  - two thouſand four hundred, or three thouſand Geometrical Paces, make — a common League of France.
  - three thouſand four hundred Geometrical Paces, or little more, make — a Spaniſh League.
  - four thouſand Geometrical Paces, make — a Dutch League, or Mile.
  - five thouſand Geometrical Paces, make — a Swediſh League, or Mile.
  - ſix thouſand Geometrical Paces make — an Hungarian Leagues, or Mile.
  - ſeventeen French Leagues, or 60000 Geometrical Paces make, — a Degree of Latitude on the Æquator.
  - three hundred and ſixty Degrees of Longitude on the Æquator, make — the great Circle of the Terreſtrial Globe.
  - the great Circle of the Terr. Globe, multiplyed by his Diameter, make — the Superficies of the Terreſtrial Globe.

The

The Terreſtrial Globe hath all its Surface in

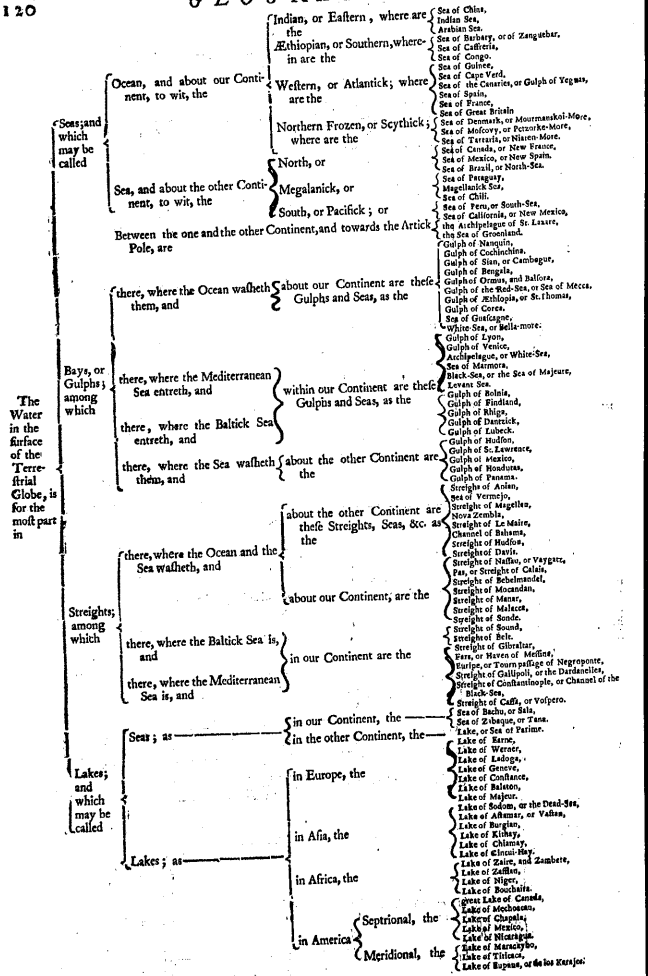
- LAND; which diſcovereth it ſelf in
  - Two Continents; whereof
    - Ours, or the moſt Ancient and Superiour, containeth three great parts; to wit,
      - Europe; where the Kingdoms or Countreys of — Turkey in Europe, / France, / Germany, / Low Countreys, / Poland, / Scandinavia, / Ruſſia, or Moſcovia.
      - Aſia; where are the Kingdoms or parts of — Turkey in Aſia. / Arabia, / Perſia, / India, / China, / Tartaria.
      - Africa; where are the Kingdoms or Countreys of — Barbary, / Biledulgerid, / Egypt, / Sara, or Deſart of Saara, the Land of the Negroes, / Guinee, / Nubia, / the Emperour of the Abyſſines. / Zanguebar, / Congo, / Monomotapa. / Caffraria.
    - The other, or New and Inferiour, is called AMERICA.
      - America Septentrionalis; where are the Kingdoms of — Canada, or New France, / New Mexico, / New Spain.
      - America Meridionalis; where are the Kings of — Peru, / Brazil, / Paraqua.
  - Many Iſles; of which the moſt famous are
    - part of Europe; as thoſe in — the Mediterranean Sea. / the Weſtern Ocean, called the Britiſh Iſles.
    - About our Continent and part of Aſia; as thoſe of — Japon, / the Philippins, / the Moluccoes, / Sunde, / Ceylan, and the Maldives, &c.
    - part of Africa; as thoſe of — Madagaſcar, or St. Laurence, / St. Thomas, / Cape Verd, / the Canaries, &c.
    - Between one and the other Continent; as — the Azores.
    - About the other Continent, and towards America Septentrionalis; as thoſe of — Terra Nouvex, / California, / the Antilles.
    - towards America Meridionalis; — the Magellanick Iſles.

  And in ſome Lands and Iſles, the moſt part unknown, towards the one and the other Pole; among the which are — Groenland, Island, &c. / Terra Auſtralis, Nova Guinea, &c.

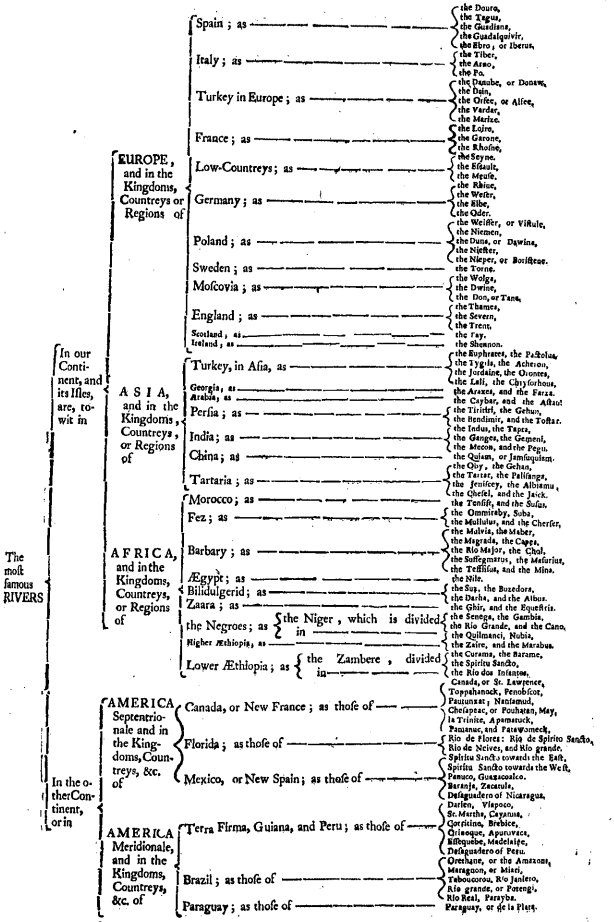
- SEA; and which may be called
  - Ocean, about our Continent,
    - Oriental, or Indian; where are the Seas of — China, / India, / Arabia.
    - Southern, or Æthiopian; where are the Seas of — Barbaria, or of Zanguebar, / Caffraria, / Congo, / Guinee.
    - Weſtern, or Atlantick; where are the Seas of — Cape Verd, / the Canaries, / Spain, / France, / Great Britany.
    - Northern, or Frozen; where are the Seas of — Denmark, / Moſcovy, / Tartaria.
  - Sea, about the other Continents,
    - North-Sea, or Seas of — Canada, or New France, / Mexico, or New Spain, / Brazil.
    - Magellanick-Sea, or Seas of — Paraguay, / Magellanick.
    - Pacifick-Sea, or Seas of — Peru, / New Mexico.
  - Gulphs, or Seas, between the Lands of our Continent, — the Baltick Sea, / the Mediterranean Sea.
    - between the Lands of the other Continent, — the Gulph of Mexico, / the Gulph of Hudſon.
  - Lakes, or Seas, in the midſt of our Continent, — the Caſpian Sea.
    - in the midſt of the other Continent, — the Lake, or Sea of Baikmo.
  - Streights; to wit,
    - between the one and the other Contin. — of Anian.
    - between the other Contin and the J. M. — of Magellan.
    - between Europe and Africa — of Gibraltar.

- WATERS; which is found in
  - In Europe, — the Tage, / the Loire, / the Rhine, / the Elbe, / the Danube, / the Boriſtene, / the Don, or Tanais, / the Volge.
  - RIVERS; of which the moſt famous, are
    - In our Continent; as
      - In Aſia, — the Tigre, and the Euphrates, / the Indus, / the Ganges, / the Quiam, or Jamſiquiam, / the Oby.
      - In Africa, — the Nile, / the Niger.
    - In America,
      - Septentrional; as — the River Canada, or St. Lawrence, / the River Paria, or Orinoque.
      - Meridional; as — the River Amazones, / the River of Plates.

The


The Water in the ſurface of the Terreſtrial Globe, is for the moſt part in
Seas; and which may be called
Ocean, and about our Continent, to wit, the
Indian, or Eaſtern, where are the
Æthiopian, or Southern, where in are the
Weſtern, or Atlantick; where are the
Northern Frozen, or Scythick; where are the
Sea of Chin.
Indian Sea.
Arabian Sea.
Sea of Barbary, or of Zanguebar.
Sea of Caffraria.
Sea of Congo.
Sea of Guinea.
Sea of Cape Verd.
Sea of the Canaries, or Gulph of Vegnas.
Sea of Spain.
Sea of France.
Sea of Great Britain
Sea of Denmark, or Mourmanskol-More.
Sea of Moſcovy, or Petsorke-More.
Sea of Tartaria, or Nieuen-More.
Sea of Canada, or New France.
Sea of Mexico, or New Spain.
Sea of Brazil, or North-Sea.
Sea, and about the other Continent, to wit, the
North, or
Megalanick, or
South, or Pacifick; or
Sea of Paraguay.
Magellanick Sea.
Sea of Chili.
Sea of Peru, or South-Sea.
Sea of California, or New Mexico.
Between the one and the other Continent, and towards the Artick Pole, are
the Archipelegue of St. Lazare.
the Sea of Groenland.
Gulph of Nanquin.
Gulph of Cochinchina.
Gulph of Siam, or Cambegue.
Gulph of Bengela.
Gulph of Ormus, and Baſſora.
Gulph of the Red-Sea, or Sea of Mecca.
Gulph of Æthiopia, or St. Thomas.
Gulph of Corea.
Sea of Gueſtagne.
White-Sea, or Bella-more.
there, where the Ocean waſheth them, and
about our Continent are theſe Gulphs and Seas, as the
Bays, or Gulphs; among which
there, where the Mediterranean Sea entreth, and
there, where the Baltick Sea entreth, and
there, where the Sea waſheth them, and
within our Continent are theſe Gulphs and Seas, as the
about the other Continent are the
Gulph of Lyon.
Gulph of Venice.
Archipelague, or White-Sea.
Sea of Marmora.
Black-Sea, or the Sea of Majeure.
Levant Sea.
Gulph of Bothia.
Gulph of Finland.
Gulph of Rhige.
Gulph of Dantzick.
Gulph of Lubeck.
Gulph of Hudſon.
Gulph of St. Lawrence.
Gulph of Mexico.
Gulph of Honduras.
Gulph of Panama.
Streight of Anian.
Sea of Vermejo.
Streight of Magellan.
there, where the Ocean and the Sea waſheth, and
about the other Continent are theſe Streights, Seas, &c. as the
about our Continent, are the
Nova Zembla.
Streight of Le Maire.
Channel of Bahama.
Streight of Hudſon.
Streight of Davis.
Streight of Naſſau, or Vaygatz.
Pas, or Streight of Calais.
Streight of Schelmandel.
Streight of Mocandan.
Streight of Mecca.
Streight of Malacca.
Streight of Sonde.
Streight of Sound.
Streights; among which
there, where the Baltick Sea is, and
there, where the Mediterranean Sea is, and
in our Continent are the
Streight of Belt.
Streight of Gibraltar.
Sea of Bacho, or Sais.
Sea of Zabaque, or Tana.
Lake, or Sea of Parime.
Sea; as
in our Continent, the
in the other Continent, the
Lake of Earne.
Lake of Weroer.
Lake of Ladoga.
Lake of Geneva.
Lake of Conſtance.
Lake of Balaton.
Lake of Majeur.
Lakes; and which may be called
Lakes; as
in Europe, the
in Aſia, the
in Africa, the
in America
Septrional, the
Meridional, the
Lake of Sodom, or the Dead-Sea.
Lake of Aſſamar, or Vaſſan.
Lake of Sirgian.
Lake of Kithay.
Lake of Chilmay.
Lake of Eſtouit-Bay.
Lake of Zaire, and Zambete.
Lake of Zaffian.
Lake of Niger.
Lake of Bouchaite.
Great Lake of Canada.
Lake of Mechoacan.
Lake of Chapala.
Lake of Mexico.
Lake of Nicaragua.
Lake of Maracaybo.
Lake of Titicaca.
Lake of Bapana, or de los Xarajos.

The


The moſt famous RIVERS
In our Continent, and its Iſles, are, to wit in
EUROPE, and in the Kingdoms, Countreys or Regions of
Spain; as
the Douro,
the Tagus,
the Guadiana,
the Guadalquivir,
the Ebro, or Iberus.
Italy; as
the Tiber,
the Arno,
the Po.
Turkey in Europe; as
the Danube, or Donaw,
the Duin,
the Oriſee, or Aliee,
the Vardar,
the Marice.
France; as
the Loire,
the Garone,
the Rhoſne,
the Seyne.
Low-Countreys; as
the Riſault,
the Meuſe.
Germany; as
the Rhine,
the Weſer,
the Elbe,
the Oder.
Poland; as
the Weiſſer, or Viſtule,
the Niemen,
the Duna, or Dawina,
the Nieſter,
the Nieper, or Boiſtene.
Sweden; as
the Torne.
Moſcovia; as
the Wolga,
the Dwina,
the Don, or Tana.
England; as
the Thames,
the Severn,
the Trent.
Scotland; as
the Tay.
Ireland; as
the Shennon.
ASIA, and in the Kingdoms, Countreys, or Regions of
Turkey, in Aſia, as
the Euphrates, the Tygris, the Acheron, the Jordaine, the Orontes, the Lali, the Chryſorhoan, the Araxes, and the Faza.
Georgia; as
Arabia; as
the Caybar, and the Aſtan.
Perſia; as
the Tiridet, the Gehon, the Bendimir, and the Toſtar.
India; as
the Indus, the Tapes, the Ganges, the Gengeni, the Meeon, and the Pegu.
China; as
the Quian, or Jamſuquiam.
Tartaria; as
the Oby, the Gehon, the Tarrar, the Paſſiange, the Jeniſcey, the Albiamu, the Oberel, and the Jaick.
Morocco; as
the Teniſh, and the Sufas.
Fez; as
the Ommirabby, Suba, the Bullulus, and the Cherfer.
Barbary; as
the Malvia, the Meher, the Megrada, the Capes, the Rio Major, the Chol, the Suffegemus, the Meſurian, the Teffiſſus, and the Mina.
Ægypt; as
the Nile.
Bilidulgerid; as
the Sus, the Buzedors, the Darbe, and the Albus.
Zaara; as
the Ghir, and the Equeſtis.
the Negroes; as
the Niger, which is divided in
the Senega, the Gambia, the Rio Grande, and the Cano.
Higher Æthiopia, as
the Quilmanci, Nubis.
Lower Æthiopia; as
the Zambere, divided in
the Zaire, and the Merabus.
the Curama, the Barame, the Spiritu Sancto, the Rio dos Infantes.
AMERICA Septentrionale and in the Kingdoms, Countreys, &c. of
Canada, or New France; as thoſe of
Florida; as thoſe of
Mexico, or New Spain; as thoſe of
In the other Continent, or in
AMERICA Meridionale, and in the Kingdoms, Countreys, &c. of
Terra Firma, Guiana, and Peru; as thoſe of
Brazil; as thoſe of
Paraguay; as thoſe of
Canada, or St. Lawrence, Toppahannock, Penobſcot, Paſſumaer, Nantemud, Cheſapeac, or Pouhaten, May, la Trinite, Apamarock, Panamue, and Pare-Pomeck.
Rio de Flores: Rio de Spirito Sancto, Rio de Neives, and Rio grande.
Spiritu Sancto towards the Eaſt, Spiritu Sancto towards the Weſt, Penuco, Guaxocolco.
Baraja, Zacatula, Deſaguadero of Nicaragua.
Darien, Vlaposo, St. Martha, Cayanus, Cortitina, Brebice, Orinoque, Apanivace, Riſiquebe, Madelaine, Deſaguadero of Peru.
Orenhane, or the Amazons, Maragnon, or Aniet, Tabocurou, Rio Janiero, Rio grande, or Potengi, Rio Real, Paraybe.
Paraguay, or de la Plata.

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All the Kingdoms, Regions, Countries, Iſles, &c. in the World, may be comprehended under theſe two Heads, *viz.*

- **Known**
  - Anciently, and in our Continent; as
    - EUROPE, with its Kingdoms, Eſtates, Iſles, &c. may be conſidered in three times three parts, and then
      - The three moſt Southern parts, are the Kingdoms, Eſtates, and Iſles of
        - Spain and Portugal, with its Iſles of Majorca, Minorca, &c.
        - Italy, with its Eſtates and Iſles of Sicily, Sardinia, Corſica, Iſles of Naples, &c.
        - Turkey in Europe, with its Eſtates and Iſles.
      - The three Innermoſt parts, and within the Continent, are the Kingdoms and Eſtates of
        - France.
        - Germany, and Belgium, with its ſeveral Eſtates; as the Swiſſes, the Griſons, &c.
        - Poland, with its ſeveral Eſtates, towards the Danube; as Tranſylvania, Moldavia, &c.
      - The three moſt Northern parts, or Kingdoms and Iſles of
        - Great Britain, and Ireland.
        - Scandinavia, or
          - Denmark,
          - Sweden,
          - Norway.
        - Moſcovy, with its Dutchies and Kingdoms.
    - ASIA, with its Kingdoms, Countreys, Iſles, &c. as they are found
      - In firm Land; as
        - Turkey in Aſia, with its Countreys, Iſles, &c.
        - Georgia.
        - Arabia.
        - Perſia.
        - India, as it is divided into the
          - Empire of the Great Mogul.
          - Peninſula of India, within the Ganges.
          - Peninſula of India, without the Ganges.
        - China.
        - Tartaria.
        - the Land of Jeſſo.
        - the Land of Papous.
      - In Iſles; as
        - In the Ocean; as the
          - Iſles of Japon.
          - Iſles of Larrons.
          - Iſles of Sonde.
          - Philippine Iſles,
          - Iſles of Ceylan, and the Maldives.
        - In the Mediterranean Sea; as
          - in the Levant Sea.
          - in the Archipelago.
        - About China, Perſia, Arabia, &c.
    - AFRICA, with its Kingdoms, Iſles, &c. as it is divded and found in
      - Africa, or Lybia
        - Exterior, or outwards; as
          - Barbary,
          - Bilidulgerid,
          - Ægypt.
        - Interior, or inwards; as
          - Zaara, or Deſart,
          - the Countries of the Negroes,
          - Guince.
      - Æthiopia,
        - Higher; as
          - Nubia,
          - Æthiopia, or the Empire of the Abyſſines.
        - Lower; as
          - Congo,
          - Monomotapa,
          - Caffres.
      - And diverſ Iſles, which are found
        - In the Mediterranean Sea; as the Iſle of Malta, &c.
        - In the Weſtern Ocean; as
          - the Canary Iſles,
          - the Iſles of Cape Verd,
          - the Iſles of St. Thomas.
        - In the Eaſtern Ocean; as
          - the Iſle of Madagaſcar,
          - the Iſle of Zocotora, &c.
  - Lately, and in the other Continent; as
    - AMERICA, with its Kingdoms, Regions, Countries, Iſles, &c. as they are divided and found in
      - America Septentrionale; as
        - Canadian, or
          - the Artick Lands; as
            - Groenland,
            - Eſtotiland,
            - Iſland, &c.
          - Canada, or New France, with its Eſtates, Iſles, &c.
          - Florida.
        - Mexican, or
          - Mexico, or New Spain, with its Audiences of
            - Mexico,
            - Guadalajara,
            - Guatemala, and
            - St. Domingo.
          - the Caribbe Iſles.
      - America Meridionale; as
        - Terra Firma, with its Eſtates, Provinces, and Iſles.
        - Peruvian, or
          - Guiana.
          - Peru, with its Audiences of
            - Quito,
            - Lima,
            - De la Plata.
          - Chili, with its Juriſdictions.
        - Braſilian, or
          - Brazil, with its Capitanes,
          - Paraguay, or Rio de la Plata, with its Parts or Provinces
          - the Megallanick Land, &c.
- Unknown; or not fully diſcovered, and lieth either under the
  - Artick, or Antartick
    - Circles; as
      - Nova Guinea,
      - Terra del Fuego,
      - Maletur.
      - Pittacorum Regio, and the like feigned Names and Places.

EUROPE, with its Kingdoms, Iſles, &c. may be conſidered in three times three parts; and then

- The three moſt Southern parts, are
  - SPAIN, with its Kingdoms or Principalities, &c.
    - Caſtile — Madrid,
    - Leon — Leon,
    - Navar — Pampelona,
    - Biſcay — Bilboa,
    - Aſturie — Oviedo,
    - Gallicia — St. Jago de Compoſtelle,
    - Portugal — Lisbon,
    - Algarve — Pharo,
    - Andalouſie — Sevil,
    - Grenada — Granada,
    - Murcia — Murcia,
    - Aragon — Caragoſa,
    - Valencia — Valencia,
    - Catalonia — Barcelona,
    - the Iſles of Baleares — Majorca.
  - ITALY, with its ſeveral Eſtates and Principalities; the Chief of which are
    - Piedmont — Turin,
    - Millain — Millain,
    - Genoua — Genoua,
    - Monteferat — Alba,
    - Parma — Parma,
    - Manque, and Modena — Mantua,
    - Veniſe — Venice,
    - Plaintez — Placentia,
    - Tuſcany — Florence,
    - Eſtates of the Church — Rome,
    - Trent — Trent,
    - Naples — Naples,
    - Iſle of Sicily — Meſſina,
    - Iſle of Sardiny — Calari,
    - Iſle of Corſica — Baſtia.
  - TURKEY, (in EUROPE,) with its ſeveral Eſtates; the Chief of which are thoſe of
    - Boſnia — Jaycza,
    - Tranſilvania — Waradin,
    - Servie — Belgrad,
    - Bulgaria — Sophia,
    - Moldavia — Zaczenie,
    - Walachia — Targovifco,
    - Romania — Conſtantinople,
    - Macedonia — Salonichi,
    - Albanie — Durazzo,
    - Theſſalie — Arpicho,
    - Epire — Perſerin,
    - Achaia — Selinps,
    - Peloponneſus — Xerras,
    - Dalmatia — Rhagufa,
    - Sclavonia — Rogus,
    - Illyris — Zenta,
    - Croatia — Wikitz.
- Together with ſeveral Iſles, as they lye in the
  - Ægean, or Grecian Seas, as — Negropont, Crete, the Iſles of Ciclades, & Sporades,
  - Ionian Seas, as — Zant, Zeffalonia, Corfu, and Cheligo.
  - Adriatick Seas, as — Zara, Leſina, Curzola, Lifa, Vegea, and Cherſo.
- The three Innermoſt parts, and within the Continent, are
  - FRANCE, with its Twelve Governments, or Generall Eſtates; viz.
    - Picardy — Amiens,
    - Normandy — Roan, or Rovan,
    - Ile of France — Paris,
    - Champagne — Troys,
    - Bretagne — Nantes,
    - Orlenois — Orleance,
    - Bourgogne — Dijon,
    - Lyonnois — Lyon,
    - Guyenne and Gaſcogne — Bourdeaux,
    - Languedoc — Toulouſe,
    - Provence — Marſeille,
    - Dauphin — Grenoble,
    - the Caſtel, Low Country — Anvers,
    - Lorrain — Metz,
    - the French County — Befançon,
    - Savoy — Cambery.
  - The ſeveral Eſtates, which lye between
    - France,
      - the Low Countreys, or the United Provinces, — Amſterdam, Rotterdam,
      - the Swiſſes — Baſle,
      - the Griſons — Coire,
      - On this ſide the Rhine — Antwerp,
      - Upon the Rhine — Strasbourg,
      - Weſtphalia — Munſter,
      - Franconia — Norremberg,
      - Sovabe — Ausbourg,
      - Bavaria — Munchen,
      - Auſtria — Vienna,
      - Bohemia — Prague,
      - Higher Saxony — Diſden,
      - Brandenbourg — Berlin,
      - Pomerania — Stetin,
      - Lower Saxony — Hamburgh,
      - Pollonia — Cracow,
      - Pruſſia — Dantzick,
      - Mazovia — Warsaw,
      - Lithuania — Wilna,
      - Volhynia — Kyovia,
      - Culavia — Brezil,
      - Polaquie — Bielz,
      - Podolia — Kamkenlec,
      - Roſſia Nigra — Lowenberg.
    - Germany,
      - Hungaria — Buda,
      - Tranſylvania — Hermenſtat,
      - Valaquie — Targovifco,
      - Moldavia — Socrowa,
      - Little Tartaria — Nigropoli,
      - Denmark — Copenhaguen,
      - Norway — Trondhem.
  - GERMANY, with its ſeveral Eſtates and Principalities; the Chief of which are
  - POLAND, with its ſeveral Eſtates; the Chief of which are
  - And ſome Eſtates or Principalities, towards the Danube and Black Sea; as
- The three moſt Northern parts, Kingdoms and Iſles, are
  - SCANDINAVIA; where are the Kingdoms and Eſtates of
    - Denmark,
      - Gothland — Calmar,
      - Sweden — Stockholm,
      - Leyland — Lodby,
      - Gothland — Abo,
      - Livonie — Rige,
      - Ingria — Nieteburg.
    - Sweden,
  - MOSCOVIA; with its ſeveral Kingdoms, Dutchies, and Provinces; the Chief of which are
    - Moſcovy — Moſco,
    - Wolomotier — Wolodomer,
    - Twine — Scwichal Archangel,
    - Cazen (Kingdom) — Cazan,
    - Aſtracan (Kingdom) — Aſtracan.
  - The ISLES of GREAT BRITAIN; where are the Kingdoms of
    - England — London,
    - Scotland — Edinburgh,
    - Ireland — Dublin.

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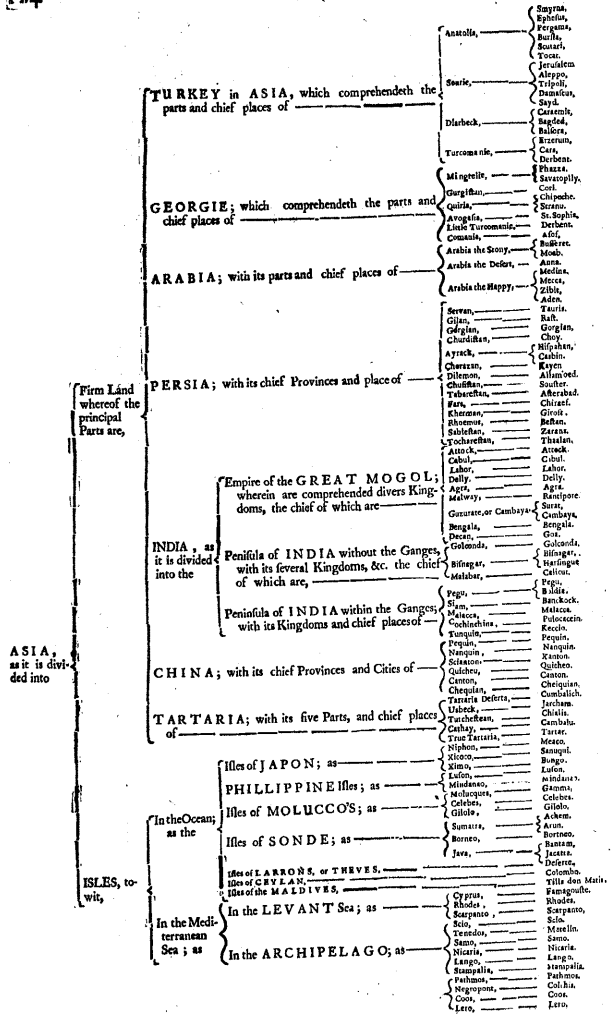

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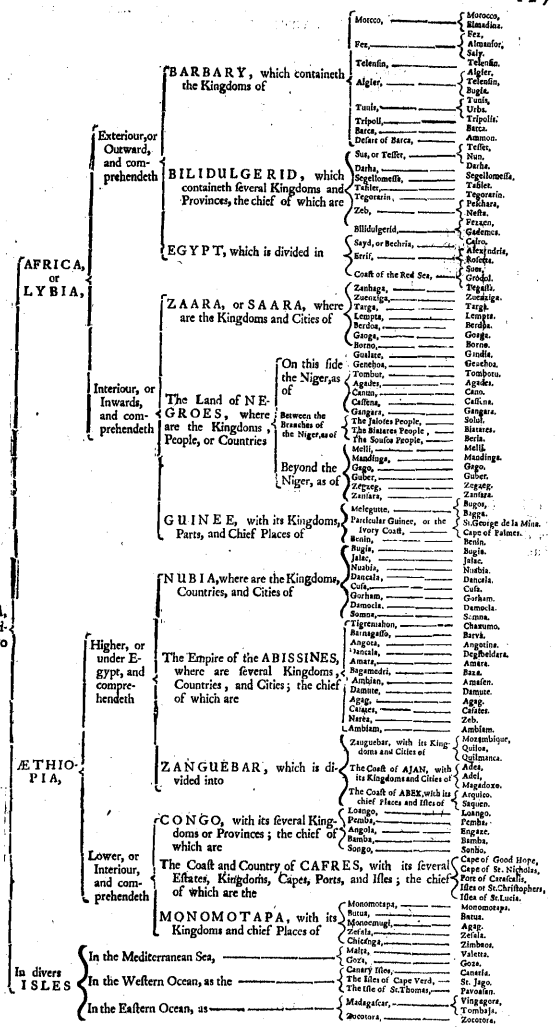

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- **AMERICA**, as it is divided into
  - **SEPTENTRIONAL**, which may be divided into
    - **CANADIANE**, where there shall be
      - The **ARTICK LANDS**, as
        - Iseland — Belle sted
        - Groenland, — Beareford.
        - North Wales, — Sea-horse-point.
        - South Wales, — Hudsons Bay.
      - **CANADA**, or **NEW FRANCE**, whose chief Parts and People are those of
        - Estotiland, — Hope-advanced.
        - Saguanay, — Quebeck
        - Canada, — Mont-Real.
        - Acadie, — Martengo.
        - New England, — Boston, Plimouth, Cambridge.
        - Mary Land, — Marles Town.
        - New York, — New York.
        - Virginia, — James Town, Elizabeth Town.
        - Carolina, — Charles Town.
        - The Hurons, — St. Peter.
        - Isle of Bermudas, — Southampton.
        - Florida, — St. Helens, Port Royal.
    - **MEXICANE**, with its Audiences, Provinces, &c. of
      - **MEXICO**, with its Provinces and chief Places of
        - México, — Mexico.
        - Panuco, — Panuco.
        - Mechoacan, — Mechoacan.
        - Thascala, — Thascala.
        - Guaxaca, — Antequera.
        - Tabasco, — No. sen. de la Victoria.
        - Jucatan, — Merida, Campeche.
      - **GUADALAJARA**, with its Provinces of
        - Guadalajara, — Guadalajara.
        - Xalisco, — Compostella.
        - Chiametlan, — St. Sebastian.
        - Culiacan, — St. Michael.
        - Cinaloa, — St. John.
        - Los Zacatecas, — Zacatecas.
        - New Biscay, — St. John.
        - Quivira, — St. Fee.
        - Anian, — Anian.
        - Cibola, — Cibola.
        - California, — Port de Montere.
        - Guatemala, — St. Jago de guate mala.
      - **GUATEMALA**, with its Provinces of
        - Vera Pax, — Vera Pax.
        - Soconusco, — Guever ian.
        - Chiapa, — Cui dad Real.
        - Honduras, — Valladolid.
        - Nicaragua, — Leon.
        - Costarica, — Cartago.
        - Veragua, — la Conception.
      - St. **DOMINGO**, with its Isles, the chief of which are
        - Cuba, — St Jago.
        - Jamaica, — Port Royal, Sevilla.
        - Hispaniola, — St. Domingo, Porto del la Plata.
        - Soana, — St. Germaine.
        - Barbados, — St. Michaels.
        - St. Christopher, — Sandy-Point.
  - **MERIDIONAL**, which may be divided into
    - **PERUVIANE**, where there shall be
      - **TERRA FIRMA**, with its Provinces, &c. of
        - Panama, — Panama.
        - Carthagena, — Carthagena.
        - St. Martha, — St. Martha.
        - Rio de la Hacha, — Rio de la Hacha.
        - Venezula, — Venezula.
        - New Andalousia, — Comana.
        - Paria, — Macureguara.
        - Caribes, — Taupuramenen.
        - Guiana, — Macureraway.
        - Popayan, — St. Fee de Antiochia.
        - Granada, — St. Fee de Bogata.
      - **PERU**, with its Audiences of
        - Pero, — Quito.
        - De los Quixos, — Baesa.
        - Pasamores, — Loyola.
        - Lima, — Lima, Cusco.
        - De la Plata, — De la Plata.
        - Chili, — Copiapo.
        - Magellanick Land, — St. Philip.
    - **BRAZILIENE**, where there shall be
      - **BRAZILE**, with its Capitaines, or Governments of
        - St. Vincent, — Sanctos
        - Rio Janiero, — Sebastian.
        - Spiritu Sancto, — Spiritu Sancto.
        - Porto Seguro, — Porto Seguro.
        - Los Isleos, — Los Isleos.
        - Baya de los Sanctos, — St. Salvador.
        - Seregippe, — Seregippe del Rey.
        - Fernambuco, — Olinda.
        - Tamaraca, — Tamaraca.
        - Parayba, — Parayba.
        - Rio Grande, — De los tres Reys.
        - Siara, — Sara.
        - Maranhan, — Junipara.
        - Para, — Para.
      - **PARAGUAY**, or **RIO de la PLATA**, with its Provinces, &c. of
        - Paraguay, — Paraguay.
        - Chaco, — Chaco.
        - De la Plata, — Assumption.
        - Tucuman, — St. Jago del Estera.
        - Urvaig, — la Conception.
        - Parana, — St. Ignatious.
        - Guayr, — Ovidad Real.

NAVI-

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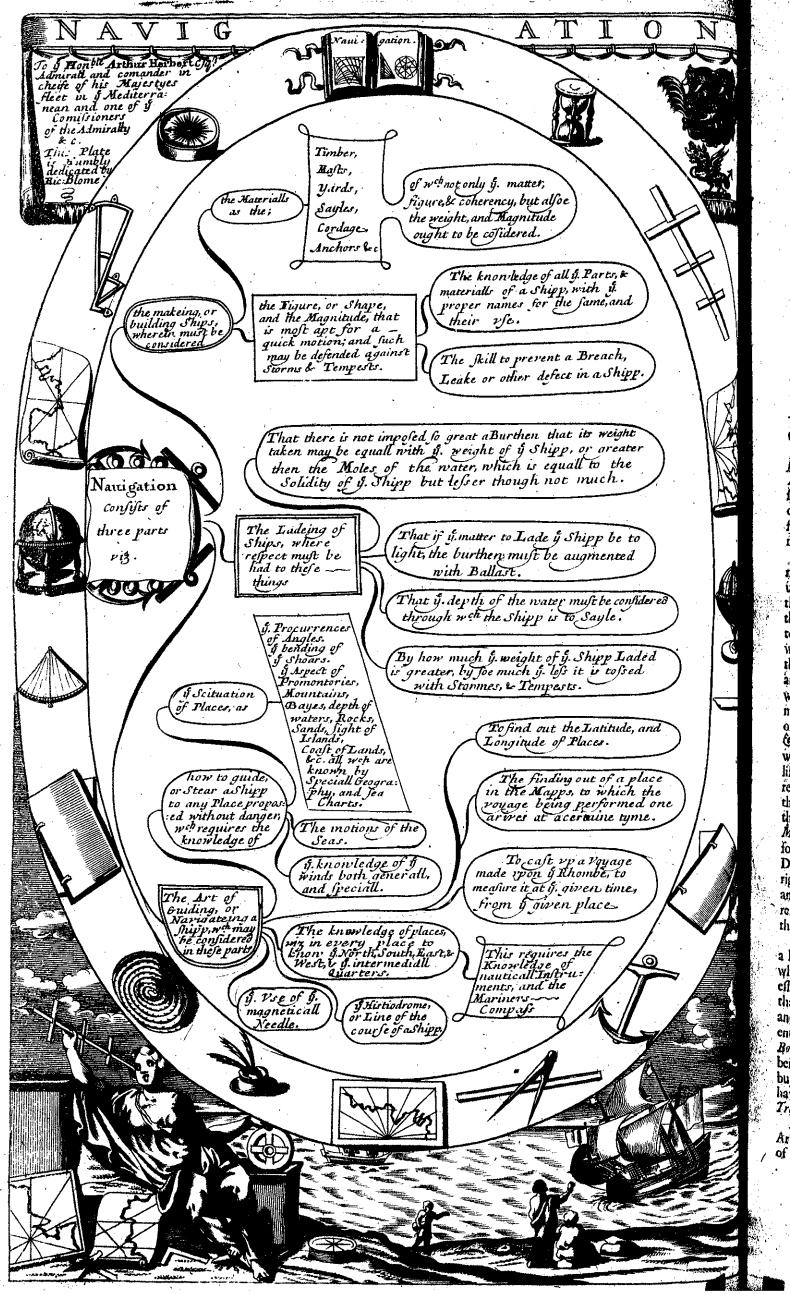

NAVIG ATION
To ye Honble Arthur Herbert Esqr Admirall and comander in cheife of his Majesties fleet in ye Mediterra: nean and one of ye Comissioners of the Admiralty &c.
This Plate is humbly dedicated by his Blome
Navigation
Timber, Mastr, Yards, Sayles, Cordage Anchors &c
the Materialls as the;
of wch not only ye matter, figure & coherency, but alsoe the weight, and Magnitude ought to be considered.
the makeing, or building Ships, wherin must be considered
the Figure, or Shape, and the Magnitude, that is most apt for a quick motion; and such may be defended against Storms & Tempests.
The knowledge of all ye Parts, & materialls of a Shipp, with ye proper names for the same, and their use.
The skill to prevent a Breach, Leake or other defect in a Shipp.
That there is not imposed so great a Burthen that its weight taken may be equall with ye weight of ye Shipp, or greater then the Moles of the water, which is equall to the Solidity of ye Shipp but lesser though not much.
Navigation consists of three parts viz.
The Ladeing of Ships, where respect must be had to these things
That if ye matter to Lade ye Shipp be to light, the burthen must be augmented with Ballast.
That ye depth of the water must be considered through wch the Shipp is to Sayle.
By how much ye weight of ye Shipp Laded is greater, by soe much ye lesse it is tossed with Stormes, & Tempests.
ye Procurrence of Angles. ye bending of ye Shoars. ye Aspect of Promenteries, Mountains, Bayes, depth of waters, Rocks, Sands, light of Islands, Coast of Lands, &c. all wch are known by Speciall Geogra: phy, and Sea Charts.
ye Scituation of Places, as
To find out the Latitude, and Longitude of Places.
how to guide, or Stear a Shipp to any Place propos: ed without danger, wch requires the knowledge of
The motions of the Sear.
The finding out of a place in the Mapps, to which the voyage being performed one arrives at a certaine tyme.
ye knowledge of ye winds both generall, and speciall.
To cast up a Voyage made upon ye Rhombe, to measure it at ye given time, from ye given place.
The Art of building, or Navigateing a Shipp, wch may be considered in these parts
The knowledge of places wch in every place to know ye North, South, East, & West, & ye intermediall Quarters.
This requires the Knowledge of nauticall Instruments, and the Mariners Compass
ye Use of ye magneticall Needle.
ye Meridrome, or Line of the course of a Shipp

NAVIGATION.

CHAP. I.

The Introduction.

NAVIGATION, is an Art containing certain Rules, necessary to be known by every *Seaman* that undertakes to Guide or Conduct a *Ship*, from one *Port* to another.

There are two sorts of *Navigation*, the one *short* and *common*, that is, Stearing a *Ship* from *Port* to *Port*, along the Coast, seldom Losing sight of Land; and this is termed Coasting. The other part of *Navigation*, is *Great* and *Artificial*, for that it undertakes large *Voyages*, and requires more knowledge, and experience.

Every Skilful *Navigator* ought to be expert in most of the *Mathematicks*, and in particular in the use of the *Globes*, *Sphære*, the *Compass*, *Card* for the *Soundings*, the *Astrolabe* or *Astronomical Ring*, the *Quadrant*, *Cross-Staff*, the use of the *Calender*, to know the use of the *Golden-Number*, and *Epact*, whereby to find the New *Moons*, and her *Ages*; the time of *Full-Sea*, and *Low-Water*, the *Spring* and *Ebb* or *Neap-Tide*, the force of the *Currents*, with the time to enter into any *Port*, which must be know as to their situation, the depths of their *Water*, their *Rocks*, *Sands*, *Clifts*, *Shoals*, &c. likewise the use of the *Tables* of *Amplitude*, with the *Senical Quadrant*, *Gunters Scale*, or the like, to reduce their several *Courses*, and to correct them. Also to be expert for the finding out the Variation of the *Compass*, for the rectifying the *Courses*. To conclude, Every *Captain*, or *Master* ought, besides the knowledge of the aforesaid things, to be expert in the Calculating the Declination of the *Sun*, and *Stars*, with their right *Ascensions*, and *Amplitudes*, their *Azimuth*, and other *Astronomical*, and *Geometrical* Practices, relating to this Art, which you will find in other *Traits* apart, wherefore omitted here.

This Art of *Navigation* is copious, requiring a larger Discourse than this Work will admit of; wherefore I shall treat of such things as are most essential, referring you to the many *Volums*, that are published of the teaching the said Art; and in particular to a *Volum* lately printed, entituled, The *whole Art* of *Navigation*, in five *Book*, written by Captain *Daniel New-House*, being a Work of much esteem, and worth the buying; and having perused the said *Book*, I have made use of some things in this following *Treatise*, referring you to the *Book* it self.

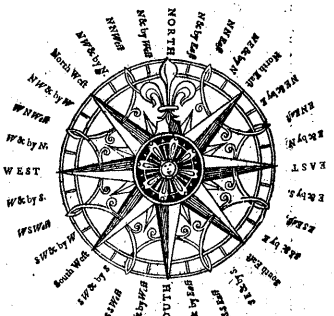
Also there are other things that relate to this Art, which are here omitted, as being Treated of in other Parts, and in particular in *Geometry*, and *Cosmography* or *Astronomy*, and *Geography*, to which I refer the Reader.

CHAP. II.

Of the several sorts of Instruments useful in Navigation.

BEfore I proceed to this Art, it will be convenient to give an Account of the *Instruments* most useful, with some directions for the attaining to the knowledge thereof, for that without them a *Pilot* cannot perform his Voyage. I shall not here insert the *Figures* of the said *Instruments*, thinking it better to be supplyed with them from the *Shops*, as being more effectual.

The *COMPASS*, is an *Instrument* of great use in this Art, distinguishing the *Horizon* into all the parts that are required for the perfect use of *Navigation*, which are divided into 32 *Parts* or *Points*, in the *Compass*, bearing the Names of so many *Winds*, as appears by the *Figure* thereof.



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The use of these *Points* are to direct the *Pilot* by *Horizontal Travers*, how to conclude the Course of his *Ship*, to recover and arrive at the place desired, knowing in what part of the *Horizon* the place desired for lieth in, and by that (and the use of the said *Compass*) they attain the same; for the *Wind* receiveth its name from that part of the *Horizon* from whence it blow-eth: And observe, that the Point of the *COMPASS* doth stand full North, by which all the other parts of the *Horizon* are found out, which said North-Point (for your better distinction) is always marked with a *Flower-de-Lis*.

There are two things chiefly to be observed in the *Compass*: First, That it be good, and true made; and in particular, that the *Flower-de-Lis*, or *Needle*, be exactly under the North and South *Line*; that the other *Rhumbs* be true placed, that the *Socket* be placed in the right Center of the *Card*; that the Point of the Pin of the *Compass* be not Blunt, or Rusty; that the *Card* may have a free Motion upon it, and be placed perpendicular in the midst of the *Box*, which said *Pin* should be made of *Brass*, *Tin*, or *Copper*; but not of *Steel*, or *Iron*, and indeed neither *Steel* nor *Iron* must be used in any part of the *Compass*, neither should it be placed near *Guns*, or other things of *Iron*; that the *Needle* be well touched with a good *Load-Stone*.

The use of the *Compass*, is to shew at any time on what part of the *Horizon*, the *North*, *South*, *East*, *West*, and all other *Rhumbs* are, by looking on the Lines drawn on the said *Compass*, which represent the several *Courses*; therefore the Names of the said *Points* must be well learn'd by Heart, and to know them so soon as you cast your Eye on your *Compass*. You must know what Point of the *Compass* the *Wind* blows over; For Example, If the Wind be North, it blows over the *Flower-de-Lis* towards the South, and so of the rest. You must likewise know how to set the *Sun*, and any Point of *Lan.*, by the *Compass*: And lastly, you must understand how the *Ship Capes*, that is, what Point of the *Compass* looks strait towards the Head of the *Ship*; for if you *Steer* your Course full East, that Point on your *Compass* must be exactly towards the Head of your *Ship*, which you must always observe.

The *CROSS-STAFF* is chiefly to take the *Altitude* of the *Sun* or *Stars*, as also the distance betwixt two *Stars*, which may be performed either by a forward or backward Observation.

The *Cross-Staff* consists of a strait square graduated *Staff*, and four *Crosses* of different Lengths, *viz.* First, The *Ten-Cross*, which belongs to that side of the *Staff* called the *Ten-Side*, where the *Graduations* begin at about 3 *Degrees*, and proceeding towards the *Center*, or *Eye-end*, encrease (by 10 *Minutes*) to 10 *Degrees*. Secondly, The *Thirty-Cross*, which belongs to the *Thirty Side* of the *Staff* where the *Divisions* or *Graduations* begin at 10 *Degrees*, and end at 30. Thirdly, The *Sixty-Cross*, which belongs to the *Sixty-Side*, where the *Graduations* begin at 20 *Degrees*, and end at 60. And Fourthly, The *Ninety-Cross*, which belongs to the *Ninety-Side*, and where the *Graduations* begin at 30 *Degrees*, and end at 90 *Degrees*. And sometimes the several Sides of the *Staff* are numbred with their Complements to 90; as againft 10 ſtands 80.

For the knowing how to hold your *Staff* to make your Observations, find the *Center* of your *Eye*, thus; Put on the 60 and 90 *Crosses* on their proper Sides, placing them exactly upon 45 *Degrees* of each proper *Graduation*; then bring the end of your *Staff* to rest upon the out-Corner of your right Eye; and if you can see each end of the two *Crosses* in a right Line one with another, then the *Staff* stands *Parallel* with the *Center* of your *Eye*, and so hold it every time you take your observation.

Although there are four *Crosses*, they are not to be used altogether, but severally, according as the *Altitude* or *Distance* you are to observe is greater or smaller: For Example, If above 60 *Degrees*, the *Ninety-Cross*; if above 30 *Degrees*, but less than 60, the *Sixty-Cross*; if above 10 *Degrees*, but less than 30, then the *Thirty-Cross*: and if less than 10 *Degrees*, then the *Ten-Cross* must be used.

For the taking the height of the *Sun* with the *Cross-Staff*, put the Traversary upon the Long *Staff*; then set the end of the Long *Staff* close to the Corner of your *Eye*, as aforesaid, winking with the other, and removing the Transversary forwards and backwards until you perceive the lower end thereof to be just with the middle of the *Horizon*, and the upper end just with the middle of the *Sun*, both agreeing with the *Sun* and the *Horizon* at one time; and thus have you the exact height of the *Sun*. This done, yet observe the same until you see the *Sun* at the highest, and so begin to descend.

And observe, that it is best to take the height of the *Sun* when it is under 50 *Degrees* in height above the *Horizon*; for until you come to 50 *Degrees*, the *Degrees* are larger marked upon the *Cross-Staff*, than after 50 *Degrees*. Also the *Sun* being under 50 *Degrees* in height, you may sooner take the height thereof, by reason of your easier seeing and viewing the upper and lower ends of the said *Staff* both at one time; but when it surpasses 50 *Degrees* 'tis not so certain, because the *Degrees* are smaller marked; and then the *Astrolabe* is most true and certain, which shall be next treated of.

The *ASTROLABE*: For this you ought to be very careful to have one that is good and true, for the knowledge of which observe these Directions. Hold it as in time of Observation; then let fall a *Thread* with some *Lead* at the end, from the Point which represents the *Zenith*, and if the *Thread* pass over the *Center* of the *Astrolabe* and the *Point*, or cover the *Line*, 'tis a sign it is good, for it must always hang so when you observe the *Suns Altitude*.

Then observe, that the *Horizontal Line* be parallel to the *Horizon*, wherefore placing your *Label* exactly upon the *Horizontal Line*, look through the two *Sights* on any sensible Point of the *Horizon*; then turning your Instrument so that the Sight that was next your *Eye* be now farthest from you, without moving, or altering the *Label* from the *Horizontal Line*; then look again, and if you can see the same Point as before through the two sights, 'tis a sign the *Horizontal Line* of your *Astrolabe* is parallel to the *Horizon*.

The *Lines* drawn from the *Center* of the *Astrolabe*, divide the *Circumference* of the Heavens in the same manner as it divides the *Circumference* of the *Astrolabe*; for all *Circles* that have the same *Center*, are divided in the same manner, by the *Lines* drawn from the common *Center*.

This Instrument is divided into as many equal parts as the *Heavens*, *viz.* 360 *Degrees*, however a quarter part is sufficient.

The use of this Instrument is easy, there being no more than to hold it so with your left *Thumb* through the Ring, that it may have a free Motion, so that the *Horizontal Line* may be parallel to the *Horizon*; then turn your right Side, and the Graduated part of the *Astrolabe* so to the *Sun*, that the *Sun* shine neither on the one, nor the other side: Then lift up the *Label* with your right Hand, until the *Sun Beams* entring through the Hole in the lower Sight, and the *Label* will shew the *Suns Altitude* above the *Horizon*. And if you count from the *Horizontal Line* to the *Label*, from the *Zenith* to the *Label*, it will be the distance of the *Sun* from the *Zenith*. But be sure that the *Astrolabe* doth hang upright, otherwise you will be at a great loss.

It is also covenient to know the true *Meridian* at *Sea*, for Sayling far *East*, or *West*, the *Compass* varieth; therefore to know the same, do thus: Set the *Sun* with your *Compass* at its rising above the *Horizon*, and then (knowing what Part and Point the *Sun* riseth at) set the *Sun* with the *Compass* at the departing under the *Horizon*, which being found out, you shall understand whether the *Compass* be varied, and how much, by the dividing the Piece of the *Circle*, contayned between the rising and setting of the *Sun*, into two equal parts; for the right Line drawn from the *Center* of the *Fly* through the Point of the partition, expresses the true *Meridian*, and the proportion of the *Circle* contained between the said *Line*, and the South Point of the *Compass* shews the quantity of the Variation.

The *QUADRANT* is an Instrument that contains the 4th part of a *Circle*, which is 90 *Degrees*, and represents the distance between the *Horizon* and the *Zenith*. This Instrument is of much use upon Land, whereby many Observations are performed, but is now not much used at *Sea*; The *Figure* of the *Quadrant* is made use of in the Treatise of *Geometry*, and therefore omitted here.

The *SEA-CHART*, or *MERCATORS CHART*, is an Instrument by which the *Mariner* guids the *Ship*, from place to place, by such Courses as by the *Chart* are laid down; and for the understanding thereof observe these or the like Directions; First, That the *Latitudes* of such places as are within the *Chart*, be well known according as they are expresst in the said *Chart*. Secondly, That the *Countreys*, or *Geography* of the *Chart*, be known, with the *Capes*, *Bays*, *Promontories*, *Havens*, *Ports*, *Rocks*, *Sands* and the like. Thirdly, That you understand to measure the distances of places upon the *Chart*. Fourthly, That the *Line* drawn upon the *Chart* with their several properties, be likewise known: And Fifthly, That by this *Chart* you may understand the true Courses between any *Capes*, *Isles*, *Continents*, or the like.

This *Chart* is better to be bought, as other Instruments, which is a very large, white, and smooth skin of *Velom* or *Parchment*; Upon this first describe a *Square*; then divide the *Æquinoctial Line* into as may equal *Parts* or *Degrees*, as you have occasion for; Then draw on your *Degrees* of *Latitude*, then your *Parallels* through every 5th or 10th *Degree* of the *Meridian*, and the *Meridians* through every 5th or 10th *Degree* of the *Æquinoctial*. As for the *Rhumbs*, *Capes*, *Harbours*, *Rocks*, *Isles*, &c. to be described thereon, must be placed according to their true *Latitude*, and *Longitude*.

The *Latitude* of places by the *Chart*, is thus found out; upon the place whose *Latitude* you desire to know, set one *Foot* of your *Compasses*; then stretch the other *Foot* to the next *East*, or *West Line*, for that *Line* is your direction, keeping that *Foot* still upon the same *Line*, moving your *Hand* and *Compasses* to the *Graduated Meridian*, and there that *Foot* of the *Compass* which stood upon the place, whose *Latitude* you would know, shews the *Latitude* of the same place.

'Tis not material to give a Draught of the *Sea-Chart*, these Instructions being sufficient; but if not, any *Instrument-Maker* of whom you buy on, will soon shew the use, with directions to use it, as indeed of any other.

I shall omit the *Plain Chart* as being much of the same nature, but not so true.

The *SENICAL QUADRANT* is composed of *Concentrick Arches*, or rather Quarters of *Circles*, and of three sorts of right *Lines*; First, Those *Parallel* to the *Line* shews the *Sines*, and *Meridians*, and are *Parallel* to the *North* and *South*, upon which the *Leagues* of *Latitude* are counted. Secondly, Those drawn *Parallel* to the *Line*, give the *Sines*, *Complements*, and *Parallels*; and are *Parallels* to the *East* and *West*, upon which the *Leagues* of *Longitude*, or departure from the *Meridian* are reckoned; and Thirdly, Those drawn from the *Center* of the *Quadrant*, to the *Limb*, shew the *Rhumbs* of the *Compass*, or the several *Courses*; and upon them the *Distance*, or *Leagues Sailed* are reckoned, which said *Leagues* are marked by the several *Arches*, or *Quarters* of *Circles*.

Observe, that when the *Distances* are great, every *Arch* or *Line* cannot be reckoned for a *League*, as when the *Distances* are small; so that in such Case you may reckon them for what you please, as your occasions require, that is, either, 2, 3, 4 or more *Leagues*; and the *Arches* must also be reckoned for as much as you have reckoned the *Lines* of *Latitude*, and *Longitude*; for Example, If you reckon an *Arch* for

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5 *Leagues*, each *Line* of *Latitude* and *Longitude* muſt alſo be reckoned for five *Leagues*, and ſo of any other.

Alſo obſerve, that when you will find how many *Leagues*, one or many *Degrees* of *Longitude* contain by a propoſed *Latitude*; or on the contrary how many *Degrees* of *Longitude* a certain number of *Leagues* (of *Eaſt* or *Weſt*) contain alſo by a propoſed *Latitude*; you muſt reckon the *Degrees* of *Latitude* given upon the neareſt graduation to the *Center* of your Inſtrument, that is to ſay, upon that which begins at the ſide of *Eaſt* and *Weſt*, and not upon the *Limb*, or utmoſt graduated *Arch*.

This Inſtrument is the moſt exact, and the eaſieſt that hath been as yet invented for the working a *Travers* at *Sea* by.

Thus having given a ſhort Account of the chief Inſtruments neceſſary in this *Art*, I next proceed to the *Art* it ſelf, and firſt.

CHAP. III.

Of the LOG-BOARD.

THE *Log-Board* is a *Board* divided into ſeveral *Colums*, according to the following Example, upon which is ſet down their dead reckoning, that is, the *Courſe* and *Diſtance Sayled* upon every ſhift of *Wind*; in which obſerve this Method; Firſt, ſet down in the firſt *Colum* the *time*, or *Hour*; In the 2*d*, the *Ships Courſe*; in the 3*d*, 4*th* and 5*th* the Knots, half Knots and *Fathoms* that the *Ship* runs: In the 6*th* the Point of the *Compaſs*, the *Wind* is at; In the 7*th* the force of the *Wind*; And in the 8*th Colum* the *Variation*.

The LOG-BOARD.

Hours	Courſe	Knots	Half Knots	Fathoms	Wind at	Force of the Wind	Variation D. M.
2							
4	S.W.W	5	1	0	S.S.E	F. G.	1. 30 W
6							
8							
10							
12							
2							
4							
6							
8							
10							
12							

Obſerve that when you begin a Long *Voyage*, you muſt keep a *Log-Book*, in which muſt be writ down every Day what is on the *Log-Board*, and in the ſame Method; as alſo what you have ſeen, how it bore from you, and the Work of your Obſervation.

You muſt know, that ſo many *Knots* of the *Log-Line*, as the *Ship* runs in half a *Minute Glaſs*, ſo many Miles ſhe *ſayls* in an *Hour*. Know that you muſt leave the *Log*, every two *Hours*, and that the beſt way is to ſet down the *Courſe* made good upon each Point of the *Compaſs*. As for Example; Suppoſe the *Courſe* is *SW*, the *Wind* being at *S S E*, and that after two *Hours Sayling* (with the ſame *Gale*) the *Log* is left out, and you find the *Ship* to run 5 ½ *Knots* in half a *Minute*; and in the ſame time you obſerve alſo, (by the *Wake* of the *Ship*,) that there is half a Point of Leeward way, by which you may conclude that the *Ship* makes good but *S W*, half a point Weſternly, which accordingly muſt be ſet down upon the *Log-Board*, and ſo continuing as in the aforeſaid *Table*, ſetting down every two *Hours* the *Knots*, half *Knots*, and the *Fathoms* that the *Ship* runs in half a *Minute*, with the ſeveral *Courſes* ſhe hath made good, and what *Wind blows*, with the force of the *Wind*, and Variation.

To keep a Reckoning of 24 Hours without the Log.

THE Method obſerved by thoſe that judge, of their diſtance, without a *Log*, is to have a *Board* of ſix *Colums*; In the firſt, the *Hour* is ſet down; In the ſecond, the *Courſe*; In the third, the *Miles*; In the fourth, the *Wind* that *blows*; In the fifth, the force of the *Wind*; And in the ſixth the Variation, and ſometimes how the *Current* ſets.

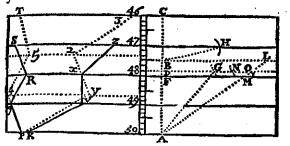
To take the Reckoning from the *Log Board*, thereby to compute the true *Courſe*, and *Diſtance* of the *Ship*, by the ſeveral *Runs* expreſt upon the *Log*, obſerve this *Method*; Firſt, double the *Knots*, half *Knots* and *Fathoms*, (if there be any) of each reſpective *Courſe*, by which you may know how many *Miles* you have ſayled; for if they expreſs on the *Log-Board*, but the *Miles ſayled* in one or two *Hours*, they muſt be doubled, to know how many *Miles ſayled* in double the time.

If your *Knots* be at 42 *Foot Diſtance*, from each other, it ſhews the ſeventh part of a *Mile* in an *Hour*, ſo that 2 *Fathom* is ſomething more than ⅛ of a *Mile*; but if the *Knots* are diſtant 50 *Foot*, then 2 *Fathoms* are a little leſs, for a *Fathom* is but 6 *Foot*.

The *Reckoning* is taken from the *Log-Board*, every *Day* at *Noon*, and uſually after your Obſervation.

How to Correct a Dead Reckoning, when the Dead Latitude, differs from the obſerved Latitude.

FOr doing this there are ſeveral ways, for you muſt correct the Dead *Latitude*, as your *Courſe* hath been; for if *North* and *South*, and by your Reckoning you find your *Latitude*, leſs than by obſervation, the *Ships* place in the ſame *Meridian*, muſt be corrected, and in the obſerved *Parallel*; For *Example*, Suppoſe you depart from *A*, (taken notice of in the following *Figure*,) in the 50*th Parallel*, or *Latitude* of 50 *Degrees*; and that you *Sayl* directly *South* 50 *Leagues*, it will appear by your Reckoning that the *Ship* is at *B*, in the *Latitude* of 47 *Degrees*, 30 *Minutes*; but by your obſervation the *Ship* is in the *Latitude* of 47 *Degrees*, therefore to correct your Dead Reckoning prick your Point in *C*, under the ſame *Meridian*, and in the 47 *Parallel*, according to your Obſervation.



IF in *ſayling North*, or *South*, the obſerved *Latitude* is leſſer than the *Latitude* by Reckoning, you muſt ſhorten your *Diſtance* in the ſame *Meridian*, according to your obſerved *Latitude*.

For Example.

Suppoſe you depart from *A*, (in the *Latitude* of 50 *Degrees*,) and *ſayl South* 43 *Leagues*,) which is 2 *Degrees* 10 *Minutes* difference) by your Reckoning it will appear that you are arrived at *D*; in the *Latitude* of 47 *Degrees*, 50 *Minutes*; but if by your obſerved *Latitude*, you find you are arrived but in the *Parallel* of 48 *Degrees*, prick your Point in *F*, and not in *D*, by reaſon your obſervation ſhews there is an Error in your Reckoning.

The cauſe of this Error is occaſioned through want of Knowledge, or care to judge well of the *Ships way* or *Run*, by making it greater or leſſer than it is; or elſe by *Stemming* a *Current*, or *Sayling* with it.

For the Correcting your Dead Latitude, by your obſerved Latitude, when you Sayl Eaſt, or Weſt.

OBſerve, that in that caſe, you cannot correct the Error of your Reckoning (if any), nor by your Obſervation diſcover if any *Current*, hath obſtructed your way, or ſet you forward, or made it greater; ſo that when you *Stem* a *Current*, alter your *Courſe*, that by the difference of *Latitude* the Error may be diſcovered.

And for correcting your Reckoning, when having *Sayled* ſo many *Miles*, or *Leagues*, *Eaſt* or *Weſt*, you find by your Obſervation that your *Courſe* hath not been under that *Parallel*, where your Reckoning placeth you; it muſt be done by your difference in *Latitude*, and *Diſtance*.

For Example.

Admit that departing from *B*, in the *Parallel* of 47 *Degrees*, 30 *Minutes*, after having *Sailed* 43 *Leagues Weſt*, by Obſervation you find, you are in the *Parallel* of 47 *Degrees*; to correct your *Courſe*, (wherein there is Error,) take with your *Compaſs* upon the *Meridian*, the 43 *Leagues*, *Sailed*, and ſetting one *Foot* in *B*, with the other deſcribe an *Arch*, which will cut the 47 *Parallel*, and the Point of *Interſection* at *H*, will mark the place of your *Ship*.

For correcting your *Reckoning* in *Sayling* obliquely or between a *Parallel* and a *Meridian*; when you *Sayl* within 5 or 6 Points of the *Meridian*, and the Dead and obſerved *Latitudes* differ, be ſure there is an Error; In this caſe if you are more ſure of the *Courſe* or *Rumb*, than of the *Diſtance*, then ſtand to your *Courſe*, and the *Ships* place muſt be corrected upon the *Courſe*, by altering your *Diſtance*.

For Example.

Admit your *Ship Sayls* from *A*, *SW*, 60 *Leagues*, and ſo by your Reckoning you find you are arrived at *I*, in the *Parallel* of 47 *Degrees*, 50 *Minutes*; but by Obſervation you are arrived but in the *Parallel* of 48 *Degrees*, in ſuch caſe ſhorten the *Ships Diſtance* upon the *Courſe*, and prick your Point in *M*, for the correct place of your *Ship*.

When your difference in *Latitude*, is greater by Obſervation than Reckoning, Enlarge the *Ships Diſtance* upon the *Courſe*. Now ſuppoſing you were more ſure of your *Diſtance Sayled*, than of your *Courſe*, by reaſon of the *Currents* and *Variation* that could not be obſerved; In ſuch caſe, you muſt relye on your *Diſtance Sayled*, and correct your *Courſe*.

For Example.

Suppoſe that departing from *A*, you *ſayl* away *SW*, 50 *Leagues*, and ſo by Computation are arrived at *M*, in the *Latitude* of 48 *Degrees*; but by obſerved *Latitude* you find you are in the *Parallel* of 47 *Degrees*, 50 *Minutes*, in ſuch caſe ſtand upon your *Leagues Sayled*, and correct your *Courſe* thus. Take with your *Compaſs* the *Diſtance ſayled*, *viz.* 56 *Leagues* upon the *Meridian*, and placing one *Foot* of it in *A*, with the other deſcribe a ſecret *Arch*, which cuts the *Parallel* of 47 *Degrees*, 50 *Minutes*, and the Point *N*, of Interſection will ſhew the place of your *Ship*.

But if you fear an Error, as much in the *Diſtance* as in the *Courſe*, in ſuch caſe part the Difference.

For Example.

If you think to have *Sayled* by the *Rumb AL*, which is *S W*, and to be arived at *M*, in the *Latitude* of 48 *Degrees*, and your Obſervation ſhews you are in the *Parallel D*, *N*, In ſuch caſe ſtand to the *Longitude* of the Point at *M*, and drawing the ſecret *Line MO*, parallel to a *Meridian*, mark your Point in *O*, for the place of your *Ship*.

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For the Correcting by the Card *a composed Course, or several Courses together, occasioned through contrary* Winds, Points of Land, Rocks, Shoals, &c.

NOte, that if the observed *Latitude* differs from the *Latitude* by estimation, you must stand to the same *Longitude*, and prick your Point in the observed *Parallel*.

For Example.

Suppose, that being departed from the *Point* at *P*, and you think you are arrived at *S*, in the Latitude of 47 *Degrees*; but by observation you find you are in 46 *Degrees*, the correction of it is to stand to the same *Meridian* of *S*, and to prick your Point in *T*, the observed *Parallel*.

But if it happen that your several *Courses* have been either to the *Southwards*, or *Northwards*, in such case divide to each single Course the difference you find between the dead *Latitude*, and the observed *Latitude*.

For Example.

Suppose, that departing from *K*. in the 50*th Parallel*, you Sail to the South by the *Rhumb K V*, *V X*, *X Z*, if by estimation your *Ship* is at *Z*, in the 47*th Parallel*, and by observation in the 46*th*, the difference is of one *Degree*, which must be divided according as each Course did alter the *Latitude* by estimation. Admit that the difference in *Latitude* of the first Course was of one *Degree*, which is the third part; in such case lengthen your first Course the third part of your difference, which is 20 *Minutes*; then placing one Foot of your *Compass* in *K*, and the other in *T*, upon the *Parallel* of 48 *Degrees* 40 *Minutes*, prick your first Point 20 *Minutes* more to the Southward as at first, and doing as much from *T*, and from 2; for the second and third Course prick your Point in 3, the place your *Ship* is arrived at according to your Observation.

But if in case you were surer of your *Course* than of your *Distance*, then stand to your *Course*; but lengthen your *Distance*.

For Example.

Suppose, that after these three *Courses P* 9, 9 *R*, and *R S*, you think you are in the *Latitude* of 47 *Degrees*, but by observation but in the *Latitude* of 46, in such case lengthen the *Distance* upon each *Course*, proportionally to the difference between the observed *Latitude*, and that by estimation; and so instead of *P* 9, prick *P* 4, and for 9 *R*. prick 4, 5, and for *R S*, prick 5 *T*.

Necessary Rules to be observed by those that keep an Account of the Ships Way.

YOu must be very careful to look often upon the *Compass*, that you may be the more assured of your *Course*, and that the *Seaman* at the *Helm* hath Steered as commanded; and to that end, one very careful ought to have the management of that Concern: Also, how the *Wind* hath blown either Fresher or Calmer, especially having a *Lee-Shoar*, if you Sail near thereunto in the Night, which is a thing so dangerous, that many *Ships* have been lost by the negligence of the *Pilot*; to prevent which, 'tis good (when the Night approacheth) to Steer your *Course* a Point of the *Compass* more from the *Land*. Also when you *Sail* close by a *Wind*, or as near it as possible, with the *Top-Sails* out, a Point of the *Compass* is commonly allowed for the *Lee-Way*: For Example, If the *Wind* was *E. S. E.* and you should *Cape S.* the *Course* will be *S.* by *W.* If with your *Courses* only you commonly allow 2 *Points* for the *Lee-way*; and if with your *Main-Sail* only (which is called a *Trie*) you allow for *Lee-way* 4 *Points* of the *Compass*; for *Hulling* in a Storm, 6 or 7 *Points* is allowed for *Lee-way*, and then the *Ship* may drive 10, 12, or 14 *Leagues* in 24 *Hours*. But these *Rules* are not always certain; for according as the *Sea* and *Currents* are, your Judgment must be of your *Course*; besides, sometimes a *Sea* will take your *Ship* on the *Lee-Bow*, and then the *Leeward-way* or *Drive* is lesser: Also, sometimes a *Sea* takes her on the *Weather-Bow*, so that then she drives more; and when the *Sea* is smooth, less is usually allowed for the *Leeward-way*. But to be certain, how much your *Ship* hath fallen to the *Lee-ward*, have regard to the *Wake*, or smooth *Water* that your *Ship* leaveth at *Stern*, setting it by your *Compass*; for its opposite *Point* will shew the true *Course* of your *Ship*. However, for your assurance, forget not to make your Observations on all Occasions, as aforesaid, which every 24 *Hours* must be writ down in your *Journal*. And also have a care when it Blows hard, of the *Lee-latch*, if you *Sail* large.

For the knowing the *distance*, or number of *Leagues* Sailed, the way most practiced by the *Pilots*, is by the *Log*, and half *Minute-Glass*; the knowledge of which is common to all *Seamen*.

It is also known by the *Pendulum*. And those expert in *Navigation* will judge how far a *Ship* hath Sailed in an Hour, only by looking how swiftly the *Water* passeth about the middle of the *Ship*, with regard to the force of the *Wind*, and how it *blows*, whether from the *Stern-quarter*, or *Bow*; as also by the *Currents*, and *Waves*.

CHAP.

CHAP. IV.

Of the Three Parts of the Art of Navigation, *and in special of the First Part*, viz. *the Making or Building of* Ships.

Proposition I.

That is termed the Nautical Art, *which teacheth how a* Ship *may with safety, and the assistance of the* Winds, *be Sailed from one place to another.*

BEcause in this *Discipline* the places of the *Earth* are compared amongst themselves, or mutually to themselves, and their respective Situation is examined, therefore deservedly it is referred to *Geography*.

This *Art* may be divided into three Parts: First, The *Art* of *Building of Ships*, which also considereth the Motion of the *Ship* in the *Water*, or else presupposeth it as known. Secondly, Concerning the *Lading* of *Ships*: And Thirdly, The *Direction*, or *Sailing* of a *Ship*, which is the Art of the *Master*, or *Pilot*, and in general the Art of *Navigation*, unto which also the Definition of the *Art* is most of all agreeable. And this part with greater right doth appertain unto *Geography* than the two former, which are more truly referred to the *Staticks* and *Mechanicks*.

Proposition II.

In the Fabricks of Ships *these things following must be observed.*

1. THat the *Matter* or *Wood* be taken which may endure very long in the *Water*, of which *Vitruvius*, and other Authors are to be consulted. Hither also belongeth how the *Woods* are to be prepared, and their Density to be augmented, the unuseful Moisture to be consumed with Fire, Pitched and defended from Corruption. This *Doctrine* must be taken from *Philosophy*.

2. That such a Figure or Shape be given to a *Ship* that is most apt for a quick Motion, and may be moved with a small power.

3. In this Fabrick, and in reference to the Figure this must be observed, that a *Ship* may with ease be defended against *Storms* and *Tempests*; but of this more when I treat about Lading of *Ships*.

4. The *Magnitude* of *Ships* must be considered, where there is a great Comparison between the *Ancient*, and *Moderns*. Some suppose, that the *Ship* of *Alexandria* (made by *Archimedes*, by the Command of *Hiero* King of *Sicily*, and presented to *Ptolomy* King of *Ægypt*) was of 12000 *Tun*. The *Ship* of *Philopater* is delivered by *Calixenus*, to have been in length 280 *Cubits*, in breadth 38, and in height 48 *Cubits*. The greatest *Ships* at this day are those of the *Spaniards*, which are called *Caracasts*; but of all Nations in the World, the *English* have most reason to brag of their gallant *Ships*, especially for the Service of the War.

5. There belongs to the Building of *Ships* the knowledge of every part, as the *Keil*, *Rudder*, *Ribs*, *Head*, *Stern*, *Masts*, *Yards*, *Cables*, *Anchors*, &c. of which not only the *Matter*, *Figure*, and *Coherency*; but also the *Weight* and *Magnitude* are to be explained.

6. To the Fabrick of *Ships* belongs the skill how to prevent a *Breach*, *Leaks*, or other defects in *Ships*.

Thus much in brief of the First Part of Navigation, concerning the Building of *Ships*.

CHAP. V.

The Second Part, which treats about Lading of Ships.

Proposition I.

The Burthen to Lade Ships withal is expresst by Lasts, *and* Tuns.

THe *Tun* of a *Ship* is supposed to be 2000 Pounds weight, the *Last* 12 *Tuns*.

Proposition II.

The Body, or Matter which is higher than Water, is not mergent altogether in the Water, but some part of it is above; but if it be of a greater weight than Water, it will sink to the bottom: If of the same weight, it keeps the given place in the Water.

HItherto belongs the various knowledge of the *Weights of Bodies*, as of *Lead*, *Gold*, *Iron*, *Wheat*, *Sand*, *Oil*, *Wine*; the gravity of all which must be compared with *Water*.

And from hence it is manifest, that the weight of the matter to Lade the *Ship*, which, taken with the Burthen of the *Ship*, ought to be lesser than the Burthen or Gravity of the *Water*, whose *Moles* are equal to the Solidity or Capacity of the whole *Ship*.

Proposition III.

By how much the Figure of the Ship *cometh to an Ordinate, that is, to a Cubick equality of Longitude, Latitude, and thickness; by so much the more it can sustain the greater burden in the Water.*

THe Demonstration must be sought from the *Staticks*.

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Proposition IV.

In the Lading of Ships *respect must be had to two things; First, That there is not imposed so great a Burthen that its weight taken may be equal with the weight of the* Ship, *or greater than the* Moles *of the Water which is equal to the Solidity of the* Ship, *but that it be lesser, though not much. But if the Matter to Lade the* Ship *be too light, the Burthen must be augmented with* Ballast. *Secondly, The depth of the Water must be considered through which the* Ship *is to Sail.*

FOr although the Gravity of the *Water* admits of this or that weight of the *Ship*, or *Lading*, when this is lesser than the equal Gravity of the *Ship* is to the *Moles* of the Water; yet if the *Water* hath less profundity than the part of the *Ship* beneath the Superficies of the *Water*, the bottom will not grant a motion to the *Ship*, but detain it. This is the reason that *Spanish Ships* carry a greater Burthen than *Dutch*, because they have the *Sea* deeper on the *Shoar*, and in the *Harbours*, as also greater *Ships* come to *Zeland* than to *Holland*.

Proposition V.

If a Ship *be so burdened, that its Weight, or Gravity, be almost equal to the weight or gravity of the Sea-Water, equal to the Capacity of the* Ship, *yet it sinketh not in the Sea; but when it shall be brought into any River it sinks to the bottom.*

THe Reason is, because the *Water* of *Rivers* is lighter than the *Water* of the *Sea*; Therefore if the weight of the Laden *Ship* be almost equal to the Gravity of the *Marine Water*, therefore it shall be greater than the Gravity of *River Water*, and so the *Ship* shall be sunk in the *River*, or carried to the bottom. Many *Ships* for this reason have perished for being over-laden by unskilful *Mariners*, or not unburdened in the Mouths of the *Rivers*. Now how this Gravity should be, is known from the proportion of the *Sea-water* to *River-water*.

Proposition VI.

Any Body swiming on the Water hath that weight, that the watery Moles *have, equal to the demergent part of this Body.*

THe part of the *Ship* being given, which is under the Water, the weight of the whole burdened *Ship* may be found; for the Gravity of the *Water* is known, or is easie to be found. For Example, One *Cubick Foot* of Water is 70 Pound; and therefore if the part of the *Ship* under Water be 2000 *Cubick Feet*, the Gravity of the watery *Moles*, which is equal to the part of the *Ship* under Water, shall be 140000 Pound; so much also shall be the weight of the *Ship* laden.

Proposition VII.

A Ship *is most commonly accounted commodiously to carry that quantity of Burthen, whose Gravity is equal to the Gravity of half the* Moles *of Water which the* Ship *can contain.*

FOr Example; If the *Ship* can carry 500000 *Tuns* of Water (whereof every one is accounted at 2000 *Pounds* weight) that is, if it contains the Water of 1000000000 *Pounds*, you may conveniently lade it with the Burthen of 250000 *Tuns*. In this sense you must understand it when they say that *Ships* are so many *Tuns*, or carry so many *Lasts*.

Proposition VIII.

By how much the weight of the Ship *laden is greater, by so much the less it is tossed with Storms and Tempests.*

SHips of 2000 *Tuns* are not in danger of those *Tempests* which are vexatious to *Ships* of 2, or 300 *Tuns*. Much more might be said, but this may suffice for *Elements*.

CHAP. VI.

The Third and Chief Part of the NAUTICK ART, viz. *The Art of Guiding, or Navigating of a* Ship, *and its subdivision of the Four Parts.*

Proposition I.

That is termed the Art *of* Navigating *a* Ship, *which teacheth unto what Quarter a* Ship *is to be guided in any situation of it in the Sea, that it may come to the proposed place without danger.*

I Shall make Four Parts of it:

1. *Special Geography*; that is, the knowledge of a place intercepted between two places, and the properties of the same.

2. The knowledge of the Quarters in every place.

3. The cognition of the *Line*, by which the *Ship* is to be brought from one place to another; for there are between every two places infinite intercepted *Lines*. This Part is termed *Histriodromice*.

4. The knowledge of the Situation of every place unto which by Sailing we arrive, or how these places are situated unto that place unto which the *Ship* is to be directed. This is the Chief Part of the *Art* of *Sailing*.

Propo-

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Proposition II.

The Cognition of the Intermedial Space doth comprehend these things.

1. THe Situations of *Places*, the Procurrences of *Angles*, the bending of the *Shoars*, the Aspect of *Promontories*, *Mountains*, and *Bayl*, the Depths of *Waters*, the Sight of *Islands*, the Coasts of *Lands*; all which are known from *Special Geography*, and *Sea-Plots*; but most easily, and with greatest certainty from Observation, and frequent *Navigation* through any Tract of *Land*, which is the only cause that some *Mariners* are more fit to guide a *Ship* to such a place, and others to another.

2. The knowledge of the General and Special *Winds*; and those that are peculiar to any place, which is exceeding useful in Navigations in the *Torrid Zone*, and adjacent places. For here a *General Wind*, and in many places *Anniversary Winds*, which are called *Mossons*, do rule, which either promote, or hinder *Navigation*; for the *Indian Seas* are Sailed by these *Winds*.

3. The Condition of the Motion of the *Seas* in every Tract, also the Quarter of it, into which Quarter the *Seas* and *Waves* are born; for they carry the *Ship* with them.

First of all, there is required a knowledge of the *Ship*, and Reflux of the *Sea*, and the time or hour of the Increase or Decrease at every Day; the supputation of which is termed the reckoning of the *Tides*; for except a *Master* or *Pilot* know this, the *Ship* is in danger when it is near *Shoars*, or *Sands*, whereof most in the greatest Increase of the Water do not hinder the passage of the *Ship*; but most do in the Decrease. So with a *Flux*, the Navigation is more facile to the Shoar, and to the Inlets of *Rivers*; and the contrary is discovered in the *Reflux*.

CHAP. VII.

Of the Knowledge of Places, viz. *the* North, South, East, *and* West, *and the Intermedial Quarters.*

Proposition I.

In every place to know the Plagas, *viz. the* North, South, East, *and* West, *and the Intermedial Quarters.*

THe knowledge of this is the most necessary of all the *Problems* of the whole Art of *Navigation*, seeing that a *Ship* must be guided to some *Quarter*, which, if unknown, there can be no direction, and the very defect of this Knowledge alone hindred the *Navigations* of the *Ancients*; and in this is the chief difference between the Ancient and Modern *Navigation*.

For the *Ancients* had not a Method, by which at any time in the large *Ocean* they might know where was the *North*, *South*, or other Quarters; therefore they could not, nor durst they commit themselves to the vast *Ocean*, but only Coasted the *Shoars*.

The *Ancients* had a double Method (which serveth also to the *Modern Navigation*) of finding our the *Quarters*; (Now this *Problem* is the same with that, to find out the *Meridian Line*, and the *North* and *South Quarters*, for these being known 'tis easie to know the rest.) First, by the *Stars*, *viz.* in the Night the *Bear*, or the *Plaice* and *Polary Star*, so called, in the extremity of the Tail of *Ursa Minor* (of great fame amongst the *Ancients*) which shewed the *North Quarter*, whence all the rest are found; for the face being turned to the *North*, the East is at the Right Hand, and the West on the Left, the *Line* of which Quarters at right *Angles* cuts the *Line* of the North and South. And these *Cardinal Quarters* being found, it is easie to find the *Intermedial Quarters*, unto which purpose, that there may be no need of a description, they had a *Circle* made with the *Quarters*, whose *Northern Line* being placed above the *Northern Line* of any place, the other *Quarters* at one sight are discovered. But in the Day they sought out the *Quarter* by the Rising or Setting of the *Sun*.

2. The other Method of the *Ancients* for knowing the *Quarters*, was the knowledge of the situation, or extension of the *Shoars*, and one *Promontory* to the other. For seeing the Quarter of this *Extension* was known to them either from *Maps*, or from Observation and Experience, they might in *Navigation* (by seeing them) know the other *Quarters*; (for one *Quarter* being known, all the rest are known,) therefore the Ancients did not far depart from the *Coasts*, *viz.* that they might know the *Quarter* by the benefit of the known Quarter of the Extension of *Shoars*; for they could not always use the Method of the *Stars*, and the Rising and Setting of the *Sun*.

3. The Third Method of the *Ancients*, of the knowledge of the *Quarters*, was the observed Course of the *Ship*; for going from any place, and guiding the *Ship* to the known Quarter, they were able from the mutation of the Course of the *Ship* to know the Quarters.

But at this Day, the Method of knowing the *Quarters* in all places, and of finding out the *Line* of the *North* and *South*, is facile by the benefit of the *Load-Stone*. There are two opposite *Points* in the *Load-Stone*, whereof one always, and in all places, turneth it self to the *North*, or the adjacent Quarter; the other, to the *South*, and so the other Points of the *Magnet* respect the other Quarters; but all of them are not considered, but only those two Points, *viz.* the *North* and *South*, which are termed the *Poles* of the *Magnet*, the one Northern, the other Southern.

And the same Vertue is communicated to the *Needle*, but by an inverted and contrary operation of Nature; for the end of the *Needle* which is touched at the *North Pole* of the *Magnet*, doth

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doth not convert it self to the North, but to the South; and that end which is rubbed at the *South Pole* of the *Load-Stone* turneth to the North.

Seeing that the *Magnet* hath this property, therefore by its help it is easie to find in any part of the *Earth*, or *Sea*, the North and South, whence all other *Quarters* are soon known.

Proposition II.

There are so many Quarters as there are Points in the Periphery of every Horizon, that is, they are infinite. Now Seamen number 16 in their small Navigations; 32 in those that are moderate; and 64 in the great Voyages through the vast Ocean.

THe *Portugals* call these Quarters *Rhumbs*; the Dutch, *de Cours*, although they attribute these Terms also to the *Loxodromical* part. But when they will denominate the *Intermedial* Quarters, they do that by the division of a space lying between two Quarters.

Proposition III.

The Magnetical Needle (as the Poles of the Magnes it self) in very few places, doth respect the very Quarter of the North *and* South; *but in most places declineth a little from that towards the* East *or* West, *and that in an equal Declination; and therefore altogether sheweth not the true Quarters. That Declination is called Chalybocliſis.*

YEt at one of the *Isles* of the *Azores*, called *El Corvo*, there is no *Declination*, but the *Needle* sheweth the exact *Northern Point*.

The same is observed in some places of the same *Meridian*, but not in all parts of it. In places situate from this *Isle* towards the *East*, (even to the *Promontory* of the Procurrent of *Africa*, called *Cabo das Angulhas*, not far from the *Promontory* of *Good-hope*) the *Needle* declineth from the *North* towards the *East*, in an equal *Declination*, even to the *Islands* of *Trisſan de Cunha*; and the *Declination* augmenteth a part more remote by 70 *Degrees*; so that it is there about 13 *Degrees*; then again it decreaseth to the places adjacent to the *Promontory de Angulhas*, where again there is no *Declination*. From that place towards the *Indies* the *Declination* of the *Needle* begins from the *North* towards the *West* at *Hamburgh*; the *Chalybocliſis* of 90 *Degrees*. At *Amſterdam* at this time about five; for the time past it was greater.

Now Observations testify, that this *Declination* doth not remain the same, but changeth in Course of time; for at *London* in *Anno* 1580, it was observed 11 *Degrees* 15 *Minutes*; but in *Anno* 1622, it was 6 *Degrees*, 13 *Minutes*; and in *Anno* 1634, it was 4 *Degrees* 6 *Minutes*. And the Observations were performed not only by the new, but old *Needles* also. At *Paris* in *Anno* 1640, the *Declination* was observed 3 *Degrees* which in *Anno* 1610, was found 8 *Degrees*, the same was also observed in other places.

Proposition IV.

To find the Declination of the Magnetick Needle, from the true Quarter of the North, in any place.

LEt the *Meridian Line* be found from the *Heaven*, as hath been shewed in the xx Chapter of *Varenius* his Art of *Cosmography*; and the *Declination* of the *Magnetical Needle* will soon be discovered. But the following *Proposition* will shew the more easy Method for the use of *Seamen*.

Proposition V.

To explain the Terms of Navigation, which are used in designing of this Declination, and the correction of the Mariners Compass, and the Modes which Saylors use to find out this Declination in the Sea.

IN the Composition of the *Compass*, the defect of the *Declination* is amended, or corrected, *viz.* the *Declination* of the *Needle*, being known in the place, for which the Instrument is prepared, that *Needle* must not be affixed to the *Line* of the *Chart*, which hath the *Flower de Lis*, and should be the *Index* of the *North*, but under that *Line*, which is removed so many *Degrees* from the *Line* of the *North*, as the *Declination* of the *Loadstone* hath been found to have towards the *Line* of the *East* or *West*; for so the *Lily*. And the *Line* of the *North*, will shew the true *North*, although the *Needle* may Decline.

But for the use of *Navigation*, because in divers places there is a different *Declination*, the *Needle* ought to be fitted to the *Chart*, that it may be carried round, the *Needle* remaining immoveable, and the *Line* of that Quarter may be brought above the *Needle*, which the observed *Declination* shall shew; for so the same Instrument shall serve for all places.

Now for the finding out of the *Declination* of the *Magnetick Needle* from the true *Line* of the *North* and *South*, thus many *Mariners* do act. They observe the Quarter of the *Compass* in which the *Sun* doth rise; and the Quarter of the *West*, in which the *Sun* sets; for although that then they are in another place, yet they are absent a small Interval from the former in which the *Declination* is not varied.

If these Quarters of the *Compass* are equally distant from the Quarter of the *Compass* in the *North*, then 'tis a sign that the *Needle* in that place hath no *Declination*, and so there is no need of Correction, but the *Needle* ought to remain under the *Line* of the *North*: But if the Quarter of the *Eastern Sun*, be further distant than the Quarter of the *Western Sun* from the Quarter of the *North*, then 'tis a sign that the *Needle* declineth in that place from the true *Line* of the *North*, towards the *West*: But lastly, if the Quarter of the *Eastern Sun* be farther distant than the *Western Sun* from the *Northern* Quarter of the *Chart*, 'tis a sign that the *Needle* declineth towards the *East*. The Quantity of the *Declination* is thus known: Let the *Arches* intercepted between the *Northern* Quarter of the *Compass*, and the *East* and *West* Quarters of the *Sun*, be noted; let the lesser *Arch* be deducted from the greater; then half of the residue is the *Declination Sought*, and so many *Degrees* the *North Line* of the *Chart*, must be removed from the *Magnetical Needle*.

Mariners use sometimes another Method, which is less subject to Error, *viz.* They observe the Quarter of the *Compass*, in which the *Sun* is discovered any time after his rising, and at that time they observe the *Altitude* of the *Sun*. Then after Noon they expect, or wait until they find the *Sun* to come unto the same *Altitude*; which being found, they observe the Quarter of the *Compass*, in which the *Sun* was then beheld; for these Quarters, or *Arches* intercepted between them and the Quarter of the *North*, the *Declination* of the *Needle* is found after the same Method, as before spoken of.

Sometimes *Mariners* skilful in *Trigonometry*, or by the help of an Vniversal *Planisphere*, use a third, or fourth Method, *viz.* when that immediately by one Observation the *Declination* of the *Needle* must be enquired to know the Quarters, for either they observe the Quarter, of the *Compass*, in which the *Sun* riseth or setteth; or they observe the Quarter in which they found the *Sun*, at any observed *Altitude*.

Then by a *Trigonometrical Calculation*, or a *Catholick Planisphere*, they find in what Quarter the *Sun* truly sticketh at this time of the rising, or *Altitude*. The Difference of this, or that Quarter observed on the *Compass*, is the very *Declination* of the *Needle*.

Proposition VI.

To shew those things which withdraw the Magnetick Needle from its natural Situation in any place, and therefore are the causes that it sheweth not the Quarters, as it ought to do.

THe chief are these, 1. The blunt extremity, or less sharpness of the *Pin* on which the *Needle* is fixed, 2. Some matter in the *Hole* that receiveth the *Needle*, 3. If the *Paper* or *Rose* lyeth beyond its *Horizontal Situation*, 4. Some admission of *Air*. And, 5. The vicinity of *Iron*. These hindrances of the true shewing must be avoyded.

CHAP. VIII.

Of the HISTIODROME, or LINE of the COURSE of a SHIP.

Proposition I.

If that any two places be situate in one Meridian, or if that another place be situated from some place towards the Quarter of the North, *or* South, *that same place shall be situated towards the same Quarter of the* North *or* South, *from all those places or Points which are interposed between those two places first assumed, one of the two places lying in the same Meridian, from another, and from all intermedial Points is situated towards the same Quarter of the* North, *or* South.

THe truth of the *Proposition* is manifest, if that it be rightly conceived. By places intercepted between two Points or places are understood all Points, which are the intercepted *Arch* of the great *Circle*, drawn through the two Points, first assumed; or of the *Points* of that *Arch*, which sheweth the shortest distance. Let that place at which the situation of the other place is expended, be termed the first; and that other whose situation is expended, be termed the second. And for the more easy understanding, the first place is so to be conceived, that it may be the same in the middle of the whole *Earth*, or in the middle of the circumjacent Regions; and by reason that it is situated in the *Brazen Meridian* of the *Globe*, infinite *Verticals* are drawn through it by the circumjacent places to the *Horizon*, and so the situation of all the rest of the places is expended at it, or the distance from the *Meridian* of it, or of its *Angles* which they make *Vertical* with the *Meridian*.

The cause of the *Proposition* is, because that the *Angle* which the *Meridian* of the first place maketh with the *Vertical* of the first place drawn through that second place, declareth the situation of the second to the first, or to the Quarter. Now if we conceive all the Points interposed between the two places assumed of one *Meridian*, (for these are they of which the one towards the other, lyeth towards the Quarter of the *North* or *South*,) it is manifest that the *Meridian* of every one of them is the same with the *Vertical*, which is drawn through every one from, or through either place assumed, that is, that there is no *Angle* between the *Meridians*, and *Verticals*; wherefore the place assumed is situated at every interposed Point towards the Quarter of the *North* and *South*.

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Proposition II.

If that any two places be assumed in the Æquator, unto one of which, or the first, the situation of the other or second be to be examined, the second situated from the first in the chief Quarter, shall be the East, *or* West, *and the second shall be situated in the same* Cardinal *Quarter, to all the places interposed; or one place of two lying in the same Æquator from another, and from all intermedial Points, is situated to the same Quarter of the* East, *or* West.

For the more easy understanding of this, let any place in the *Æquator* be taken, and so placed, that the wooden *Horion* may become the *Horizon* of it, that is, that the *Poles* of the *Earth*, may be in the *Horizon* it self; then let the second place in the *Æquator* be taken, whose situation or Quarter is to be considered in the first place. It is manifest that it is the chief Quarter of the *East* or *West*. For the *Æquator* is *Vertical* to it, which is drawn from the first place through the second Perpendicular to the *Horizon*, and cuts the *Meridian Line*, at right *Angles*; the same is also true concerning all the interjected Points, which if that they be brought to the *Brass Meridian*, the *Wooden Horizon* shall be their *Horizon*, and the *Æquator* shall be the prime *Vertical* of them which cuts the *Meridian Line* at right *Angles*, and passeth through the second place; therefore this second place shall be situated to all those interjected Points in one and the same *Cardinal* Quarter of the *East* or *West*.

Proposition III.

If that the second place with the first be not situated in one and the same Meridian, *and both of them be not in the* Æquator; *the second place shall not be situated to the first, and to all interposed Points in one and the same Quarter, but in divers Quarters at divers Points.*

From this *Proposition* depends the knowledge of the Original of *Lines* which the *Ship* makes; therefore this ought to be well understood.

Let any two places be taken in the *Globe*, which neither of them are in the *Æquator*, nor in one *Meridian*, (for in these two kinds of situation the Quarter of the second place is not varied at the intermedial places). For Example, Let *Amsterdam* be taken for the first place from whence the Voyage is to be begun, and *Fernambuck* in *Brasil* for the second, or unto which the Voyage is appointed. Let *Amsterdam* therefore be brought to the *Brass Meridian*, and let the *Pole* be Elevated for the *Latitude* of the same (for so the *Wooden Horizon* representeth the *Horizon* of the place), let the *Quadrant* be affixed to the *Vertex*, and let it be applyed to *Fernambuck*, it will shew the Quarter in the *Horizon* in which *Fernambuck* lyeth from *Amsterdam*. And the *Arch* interjected between these two places exhibiteth on the *Globe* the intermedial Points. It must therefore be shewed, that the Quarters in which *Fernambuck* lyeth from every one of these Points are not the same, but all divers, or that from every one of these intermedial places *Fernambuck* doth not lye towards one and the same Quarter.

For the understanding of this, we must repeat from the preceding Doctrine that the *Angle* with the *Meridian* of his assumed place maketh, which the *Vertical* passing through the other place, sheweth the Quarter of another place from some one place assumed; or the *Arch* of the *Horizon*, intercepted between the *Meridian* and this *Vertical*, as the *Angle* sheweth the Quarter of *Fernambuck* from *Amsterdam*, which the *Quadrant*, with the *Brass Meridian* maketh (which is of *Amsterdam* it self). Therefore to prove the truth of this *Proposition*, let what Points you please be taken between *Amsterdam* and *Fernambuck* in the *Arch*, subject to the *Quadrant*, and let the *Meridians* passing through by them be conceived. It is best to take those Points, through which on the *Globe* the *Meridians* pass (or the *Circles* of *Longitude*); because therefore the *Quadrant* passeth through every one of these places, and *Fernambuck* it self, it will represent the *Vertical* of every place, in which *Fernambuck* lyeth from them. Therefore the *Angles* which it makes which the *Meridians* of each place, are the *Angles* of Position, and shew the Quarters in which, or towards which *Fernambuck* lyeth from every intermedial place. Now these *Angles* are unequal, and of a different *Magnitude*; therefore the Quarters also, towards which *Fernambuck* lyeth from those places, are divers. Now that these *Angles* are unequal, is manifest from the very Sight; or more evident, if that by any Interval of the *Compass*, you draw an *Arch* from each Point, and measure these *Arches* intercepted between each *Meridian* and the *Vertical*: Or if that we have ready by it self a crooked portion, which may be fitted to the Superficies of the *Globe*; or if that the places themselves be brought to the *Brazen Meridian*, and the *Pole* be elevated for their *Latitude*, let the *Quadrant* be applyed to the *Vertex*, and to *Fernambuck*, and in that situation let the *Degrees* of the *Arch* of the *Horizon* be reckoned.

Therefore the streight lined *Maps*, and *Sea Charts* are very defective, which do so represent the places, that if that any two places be taken, at one of which the Situation or Quarter of the other be examined, this other doth seem to be in one and the same Quarter from the intermedial places, which yet is false; the cause of which is, that they exhibite the *Meridians Parallels*, which yet do meet in the *Poles*: But few *Seamen* regard this fault, so that they do but relate the *Course* or *Quarter* which they ought to have observed in *Sayling* from one place to another.

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Proposition IV.

If a Voyage *be to be made, or that a* Ship *be to Sail from one place to another (which two places are not in one* Meridian, *or both of them in one* Æquator*) by a most short Cut, or by this means, that it may never recede from the interposed Arch of the* Vertical, *in such a* Voyage *the Quarter is changed every moment, or the Quarter becometh another and another, into which the* Voyage *is to be taken, or the* Ship *is to be Sailed.*

This *Proposition* is manifest from the foregoing. For let the Voyage be taken from *Amsterdam* to *Fernambuck* by the neareſt way, that is, through the *Arch* of the *Quadrant* affixed at *Amsterdam*, and passing through by *Fernambuck*; because therefore every where in the whole Voyage, or in every Point the Voyage is directed towards *Fernambuck*; and it is shewed in the precedent *Proposition*, that the Quarters are divers, towards which from those middle Points *Fernambuck* lieth; therefore it is manifest, that the *Quarter* becometh another and another in every Moment, and in each *Point* into which the *Ship* is to Sail, or to be Sailed, that it may respect *Fernambuck*.

But if that the places be situated in one *Meridian*, or if that both be in the *Æquator*, the case is otherwise; for in them the same Quarter of the Voyage of the *North* or *South* remaineth; in these the *Cardinal Quarter* of the *East* or *West*.

Proposition V.

A Voyage *can't be so undertaken, or a* Ship *so directed, that it may tend in each moment to other and other* Quarters; *but for some time at the least (whilst it is moved) it tendeth to one and the same* Quarter *in appearance. Therefore whilst we are to Sail from one place to another, such a Way, or Line of a Way, is most convenient, whose every two near Points are situated in one and the same* Quarter *in shew, although that this Way be not the shortest.*

A *Ship* can't tend from one Quarter to another in a moment of time; but whilst that it is moved (for some time at least) it tendeth to it. Moreover, it can by no means be done, that the *Seamen* should know the Quarters unto which the *Ship* should be Sailed, if that another Quarter were so often to be assumed.

Therefore it is evident, that that Passage between two places is most commodious for *Navigation*, whose every two vicine *Points* are situated in one and the same *Quarter*, so that the *Ship* may be continually directed unto one *Quarter*, and to come by such a direction to the place appointed. This being supposed, let us enquire what Way is thence for the Motion of the *Ship*? which Way indeed, if that the places be situated in one *Meridian*, shall be part of the *Meridian* it self: If in the *Æquator*, that Way shall be a portion of the *Æquator* it self: If in a *Parallel*, it shall be a part of this *Parallel*: If in any other *Circle* besides these, that Way shall be another *Line*, not that *Circle*, as shall be shewed hereafter.

Proposition VI.

If that a Voyage be appointed, or that a Ship *be directed to the* North *or* South Quarter, *(that is, if that the place from whence, and the place unto which be in one* Meridian*) the Line of the Motion of the* Ship *it self shall be a part of the* Meridian.

It hath been already proved, for the place required at all the Intermedial places, that is, at the *Points* of the *Arch* of the *Meridian* is situated in one and the same *Quarter* of the *North* and *South*, as is there said. And by the preceding *Proposition* such a way is commodious for *Navigation*, from place to place, whose every two vicine *Points* are situated in one and the same Quarter. Wherefore seeing that the *Arch* of the *Meridian* is such a way, that shall be the *Way* or *Line* of the motion of the *Ship*, *viz.* which the *Ship* by its motion describeth, whilst that it is continually directed, or steered to the *North* or *South*.

Proposition VII.

If that a Voyage be appointed from any place situated in the Æquator *towards the* East, *or* West Quarter, *the* Line *of the Motion is a portion of the* Æquator *it self.*

You are already shewed, that if two places be taken in the *Æquator*, the first, from whence the second, unto which the *Voyage* is appointed; that the second is situated in one and the same *East* and *West Quarter* from all the interposed *Points*, that is, from the *Points* of the *Arch* of the *Æquator* it self. Because therefore the *Ship* is continually directed unto these *Quarters*, the *Arch* of the *Æquator* interposed between these two places shall be the way of the Motion of the *Ship*. And because we have already supposed, that such a Way between two places is to be chosen, and is commodious for *Navigation*, *viz.* whose every two vicine Points are situated in one and the same *Quarter*, such a portion of the *Æquator* shall be chosen for the Way of the *Ship*.

Proposition VIII.

If that a Voyage *be undertaken from any place situated without the* Æquator, *towards the* East *or* West Quarter, *so that the Ship continually may be directed to either of these* Quarters, *the circumference of the vertical Circle shall not be the* Line *of the Motion of the* Ship; *but the Parallel of the* Æquator, viz. *the Circle of the* Latitude *of the place from which the Voyage is appointed.*

For because that a *Ship*, whilst it tendeth from one *Meridian* to another, is supposed to have respect to the same *Quarter*, it will not remain

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remain in the *Vertical*, but presently into another *Point* of the vicine *Meridian*, *viz.* which is a *Point* of the *Parallel* of the *Æquator*, or of the *Circle* of the *Latitude* of the place whence the Departure was made. For every Point of this *Circle* is such, that the *Tangent Lines* of this *Circle* being brought unto them, may respect the Quarter of the *East* and *West*, of each of these *Points*. Furthermore, the *Keel* of the *Ship*, because that it is continually supposed to be directed towards these *Quarters*, always shall touch this *Parallel* in any *Point*. Or by reason that any two *Points* of this *Parallel* are such, that one is situated from the other towards one and the same *Quarter* of the *East* and *West*, and the *Ship* is supposed continually to be directed unto this *Quarter*, neither is there any other *Line* on the *Globe*, whose Points are so directed; therefore it follows, that the Way of the Motion of the *Ship* is this *Parallel* of the *Latitude* of the place.

From the three foregoing *Propositions* we collect, that if a *Voyage* be undertaken from any place, or that the *Ship* be continually directed towards any *Cardinal Point*, that the Way of the *Ship* is circular.

Proposition IX.

If that a Voyage *be appointed from one place to another, situated in the same* Parallel, *or* Circle *of* Latitude, *this Way of the* Ship *shall be a portion of that* Parallel, *although this be not the shortest way.*

FOr that *Line* is chosen for the *Navigation* of the *Ship*, by which we arrive at the place appointed, by directing the *Ship* continually to one and the same *Quarter*. And any two of the Points of the *Parallel* of the *Circle* are such. Wherefore, the portion of the *Parallel* shall be the way of the Motion of the *Ship*.

There is therefore a threefold Situation of Places, from one of which to the other, when a *Voyage* is undertaken, the way of the *Navigation* is the *Periphery* of the Circle. 1. If that both places be in one *Meridian*. 2. If that both be in the *Æquator*: And 3. If that both be in one *Parallel*, or Circle of *Latitude*. In the two former kinds of Situation, the *Way* or *Line* of *Navigation* is the same with the Distance or shortest *Way*: But in the third Situation, the *Line* of the *Navigation* is divers from the shortest *Way*; for this is the *Arch* of the greatest *Circle*, interjected between two places. In any other Situation of Places, the *Way* of the *Navigation* can't be the *Periphery* of the *Circle*, as is just now shewed.

Proposition X.

If that a Voyage *be undertaken from any place towards any Quarter not* Cardinal, *so that the* Ship *may be continually directed to that Quarter, the Motion of the* Ship *is not circular, but a crooked* Line, *and encompassing the* Earth *with infinite Bendings and Windings.*

SUppose a *Ship* to Sail from some place, when she hath arrived to the vicine *Meridian Point*, it is directed towards the Point of the following, or nearest *Meridian*, which is situated in the same *Quarter* unto the first *Point*, in which this is first to the first place, and so also in the following *Meridians*. Now these *Points* of all the *Meridians* do not make the *Periphery* of the Circle, but a solid crooked *Helicoides*. A distinct explication of this matter is more easily shewed on the *Globe*, than by many words.

Loxodromy is a Way or Line of Motion, which the *Ship* makes whilst it moveth from one place continually towards one *Quarter* not *Cardinal*.

This is the *Nominal definition*; but the *Essential definition* of this *Line*, that is, the knowledge of the Nature and Properties of it is most difficult; for neither is it an *Helix*, as many think, neither doth it depend on any property of the *Load-Stone*, who say, that it hath its existency thence, because the *Ship* followeth the conduct of the *Load-Stone*; neither is it composed of the *Minute Particles* of many *Peripheries*, as *Nonnius* saith. Neither is the Explication of *Snellius* plain, who saith, that *Loxodromy* is an *Heliocoidical Line* in the Superficies of the *Terrestrial Globe*, with a right *Line* touching about every where with the *Meridians* in total, by contact it comprehends those Points, equal *Angles* to those drawn out; for *Snellius* doth not explain how such a *Tangent* ought to be conceived, or how to be drawn: And to speak properly, *Loxodromy* hath not *Right Lines Tangent*, because it is a solid *Line*, when that *Tangents* are drawn to plain *Lines* to a Curvature; for in solid *Lines* infinite *Tangents* may be brought to any Point. Moreover, that Definition may also agree to other Draughts of *Lines*, when unto any Point of such a *Meridian*, such a *Tangent*, and crooked *Line* may be conceived to be drawn from the vicine *Meridian*.

Also our *Definition* may be thus proposed: *Loxodromy* is a crooked *Line*, encompassing the *Earth* with many windings, every *Point* of which lieth from all its other *Points* in appearance in one and the same *Quarter*; or in which, if that two *Points* be taken, one *Point* lieth from another, and all the Intermedial *Points* in one *Quarter*; or from any *Point* of which if that *Circular Arches* be drawn unto all the rest of the *Points*, these *Arches* make equal *Angles* with the *Meridian*, which passeth through all these several *Points*.

Propo-

Proposition XI.

If that a Voyage *be undertaken from one place to another, which is not situated with the former in the same* Meridian, *or* Æquator, *nor* Parallel; *and in the whole* Voyage *the* Ship *be directed to that Quarter in which the place designed is situated from the place of the Departure, you shall never by this* Voyage *come to the place designed, but continually the* Ship *shall be removed more and more from it.*

THis notable property of *Navigation* seemed miraculous to *Mariners* when that it was first observed, which hapned in the time of *Petrus Nonnius*, the *Portuguez Mathematician*, who wrote two Books of this Subject; after him many *Mathematicians* laboured in the explanation of this matter, or crooked *Line*: And lastly, *Mariners* found it necessary for the *Nautick* use, and thence *Tables* were made.

But the cause of this *Phænomenon* is, that the *Ship* being continually directed unto that *Quarter* in which the second place from the first is situated, it remaineth not in the *Periphery* intercepted between these places, but whilst that it cometh to one *Point*; because here is a new *Horizon*, and another *Quarter* the extension of the assumed Course; and this is continually done in the following *Points*, thence existeth the crooked *Helicoidical Line*, in which whilst that the *Ship* is moved in some places, it is more and more removed from the determined place, and else where it approacheth more near.

Proposition XII.

When a Voyage *is to be undertaken from one Place towards another, situated in the same* Meridian, *or towards the Quarter of the* North *or* South, *the* Ship *is continually to be directed to this Quarter of the* North, *or* South; *or a* Meridian *is to be chosen for the Way of the* Ship, *and it will arrive at the other place.*

1. WHen a *Voyage* is to be undertaken from one place to another, and both are in the *Æquator*, the *Ship* shall be guided into that *Quarter*, in which the other place lieth from the first; that is, to the *Quarter* of the *East* or *West*, or the *Line* of the *Æquator* is to be taken for the Way of the *Ship*.

2. When a *Voyage* is to be undertaken from one place to another, and that they are both situated in one *Parallel* of the *Æquator*, the *Ship* is not to be guided unto that Quarter, in which this other place from the first lieth, or which is extended from the first to the other; for the *Ship* would never arrive at the other place, but would go with infinite windings about the Earth towards the *Poles*: But the Course must be made into the Quarter of the *East* or *West*; for whilst that the *Ship* tendeth unto that, it describeth by its Motion the *Parallels* of the *Æquator*, and so arriveth at the other place.

3. When a *Voyage* is not be made from one place to another, which are neither in one *Meridian*, nor both in the *Æquator*, neither in one *Parallel* of the *Æquator*; the *Ship* must not be guided to that *Quarter* in which the other place from the first lieth; for it would never arrive to the other place, but the Motion of the *Ship* would describe the *Loxodrome*, which would not pass through another place: But the Course must be directed unto that Quarter into which (whilst the *Ship* moveth) it describeth the *Loxodrome*, which passeth through another place into that *Quarter*, whose *Angle* with the *Meridian* is equal to the Inclination, or the *Loxodrome*, which passeth through these two places.

Proposition XIII.

Infinite Loxodromes *may proceed, or be conceived from any place of the* Earth, *as there are infinite* Verticals; *but yet, there are only* 28 *reckoned about every place*, viz. 7 *in the* Quadrant, *between the* Meridian *of the place, and the* Parallel *of the place, so that they divide that right* Angle *into* 8 *equal parts; and the* 2 *vicine are distant an equal* Angle; *Yet the* Parallel *it self is termed an Eighth* Loxodrome.

BUt they are called by the same Names by which the *Winds*, or *Quarters* are named. On the *Globe* they are beheld to proceed and turn round about the *Earth* from the *Center* of the *Compass*, or also from other Points of the *Meridian*. But in *Nautick* use, the Intermedial *Loxodromes* are denominated by a distance from the adjacent *Loxodromes*: For Example, in a third part, a fourth part more *North*, more *East*.

Proposition XIV.

A Loxodrome *intercepted between two places is almost, or according to the sense, equal to the* Hypothenusa *of a right Lined plain* Triangle, *whose one* Cathetus *is of an equal distance of* Latitude *of those two places; the other* Cathetus *is of an equal difference of* Longitude *of the places taken in the* Parallel, *which is in the Middle, between the* Parallel *of those two places.*

SUch *Triangles* are termed *Loxodromical*; but places very near are to be taken for an accurate *Calculation*, that a small portion may be interposed, *viz.* places whose difference of *Latitude* is only of one *Scruple*.

Proposition XV.

The Parts of the Loxodrome *intercepted between* Parallels *distant by an equal Interval are Equal.*

THerefore many small *Loxodromical Triangles* are conceived in each *Loxodrome*; of which, if that the *Loxodrome* of one be supputed, you have the quantity of the *Loxodrome* from one place into another, whose *Latitude* is known.

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Proposition XVI.

The Latitude, *and difference of* Longitude *of two places being given, to find out the* Loxodrome, *by which you may Sail from one place to another; or two places being given on the* Globe, *or* Map, *to find out the* Quarter *unto which the* Ship *is to* Sail, *or to be brought from one place to the other.*

THis is the chief, or rather the only *Problem* of the whole *Art* of *Navigation*, unto which all the reſt are to be referred. If that there be no difference of *Latitude*, the *Loxodrome* ſhall not be the Way of the *Ship*, but the *Parallel* of thoſe places which yet is commonly termed the *Eighth Loxodrome*; becauſe after the ſame Mode (as the other *Loxodromes*) it is generated by the Motion of the *Ship*, which is directed to the *Eaſtern* or *Weſtern* chief *Quarter*. If that therefore there be no difference of *Latitude*, they ſay that the *Eighth Loxodrome* ought to be taken, and the *Ship* muſt be Steered to the chief *Oriental*, or *Occidental Quarter* in the whole *Navigation*. For although it be not directed to the appointed place, yet by this falſe Direction the *Ship* ſhall be brought to the place.

If that there be no difference of *Longitude*, the Way of the *Ship* ſhall not be *Loxodromical*; but a part of the *Meridian* in which both the places lye, and the Quarter of the *North* or *South* is taken for the Direction of the *Ship*.

But if the places given be of a different *Latitude* and *Longitude*, and that you are minded to work by the *Globe*, let the given *Latitude* be noted on the *Brazen Meridian*; and if the *Parallel* of one *Latitude* have in it the *Center* of any *Compaſs*, or from whence the *Loxodromical Lines* were drawn; let this be brought on the *Globe* to the *Meridian*, under the noted *Degrees* of *Latitude*; then let the *Globe* be turned round until ſo many *Degrees* of the *Æquator* paſs through the *Meridian*, as there are *Degrees* in the difference of *Longitude*; and then let it be obſerved, whether any Point of the *Loxodrome* (brought from the *Center*) be under the noted Point of the *Meridian*, that is, the *Loxodrome* ſought, and it ſheweth unto what Quarter the *Ship* is to be directed, that it may arrive from the given place unto the place given. If that there be no *Point* of the *Loxodrome* under the noted *Point* of the *Meridian*, the *Loxodrome* Intermedial between thoſe two near to that *Point* muſt be taken.

But if that the *Center* of any *Compaſs* be to be found in neither *Parallel* of the *Latitude* from which the *Loxodromes* were drawn, let ſome *Loxodrome* be choſen which may appear near to that demanded, and let it be brought to one Point of the noted *Latitude*, or of the *Meridian*; and let the *Globe* be turned (as before) until that the difference of *Longitude* paſs through the *Meridian*.

This being done, if that any Point of the aſſumed *Loxodrome* be under either noted Point of the *Meridian*, the taken *Loxodrome* ſhall be that which is demanded. If that ſuch a *Point* be not found, another *Loxodrome* muſt be taken, and you muſt do as before, until ſuch an one be found; any *Point* of which being found, let it be removed under the other noted *Point* of the *Meridian*, or at leaſt no long Interval from it, and the *Loxodrome* ſhall be denominated from thoſe nigh it, amongſt which it is to be conceived as the midſt.

In *Sea Charts* it is performed after this *Mode*, as the *Quarter* of one place is found from another, which Method in *Maps* of equal *Degrees* of *Latitude* is faulty; but in *Maps* of unequal *Degrees* of *Latitude*, it accurately enough diſcovers the *Loxodrome* or *Quarter* unto which the *Ship* is to be Sailed.

Alſo *Mariners* have another Method eaſie enough, in which by the Solution of a *Plain right Angled Triangle* the *Loxodrome* of *Navigation* is found; but to that Method they uſe a *Table*, which they call a *Table* of Increaſing *Latitude*.

CHAP. IX.

Of the Chief Problem of the Art of Navigation, viz. *of finding out a Place in the* Maps, *unto which the* Voyage *being performed, we arrive at a certain time; or of finding out the* Longitude, *and* Latitude *of this Place.*

Propoſition I.

The Quarter can't be known unto which the Ship *is to be Sailed, that it may come to the appointed place, except that the place be known in which the* Ship *was at that time.*

WE have ſaid in the former *Chapter*, that this is the chief *Problem* of the *Mariners Art*, concerning the finding out of the *Quarter* to which the *Ship* is to be directed; but that can't be found, except that the place be known whence the *Ship* is to be directed; therefore the Solution of the *Problem* for finding out the Place is neceſſary.

Propoſition II.

To find the Place in the Maps, *at which the* Ship *arriveth, or toucheth at any time.*

THis is that Work which the *Dutch* call, *Het besteck in de Paskaart*. They note with a *Pin* every Day on the *Map* the place to which they ſuppoſe the *Ship* to have touched, that by this means they may diſcover in what place they are, and unto what *Quarter* the *Ship* is to be Sailed. They uſe a threefold Method in this Affair, as they ſuppoſe this or that to be more rightly obſerved.

1. The *Rhumb* being obſerved in which the *Ship* was directed from the place of the firſt Day, or from the place given on the *Map*, or the *Rhumb* in which the *Ship* was moved, and the quantity in the Interim of the *Voyage* made, being obſerved. Theſe two things being known, the place of the *Ship* is found thus on the *Map*: Let the *Rule*, or *Compaſs* be taken, and one *Shank* of it be applyed to the place of the former Day, or from which the *Ship* departed; let the other *Shank* be applyed to the *Vicine Line*, which repreſents the obſerved *Quarter*, or *Courſe*: Let the *Point* of the *Shank* be noted with *Chalk*, which is eminent over the place of the Departure. Then by the Interval of the *Compaſs*, let the *Miles* of the performed *Voyage* be taken from the oppoſite *Scale*, and let one *Foot* of the *Compaſs* be put upon the place of the Departure; but let the *Rule* be moved on the *Line* of the *Quarter* until the other *Foot* of the *Compaſs* touch the noted *Point* of the *Rule*. The place of the *Map* that is ſubject to that *Point* in that ſituation of the *Rule*, is that demanded, *viz.* in which the *Ship* then is.

But if that you determine to find out more accurately the *Point* on the *Map* by *Calculation*, or the place of the *Ship* it ſelf, the *Problem* ſhall be this: The *Latitude* and *Longitude* of one place being given, and the *Quarter* being given in which they Sailed unto the other place, with the *Voyage* performed, to find out the *Latitude* and *Longitude* of the other place. For theſe being found, you may more accurately note the place of the *Ship* on the *Map*.

2. The *Quarter* being obſerved in one known place, to another unknown, and the *Latitude* of this other, or *Elevation* of this *Pole* being obſerved, to find the Situation of this other place on the *Map*.

Let one *Shank* of the *Rule* be applied to the *Quarter* obſerved near the place; and let the other *Shank* be placed on the place known (or whence the *Voyage* is begun) and make there on the *Shank* a *Mark* with a Chalk; then let the *Shank* applied to the *Quarter* be moved until the other noted Point of the *Shank* applied to the *Quarter* fall in on the *Parallel* of the obſerved *Latitude*. For the Point of the falling in, is the place ſought, *viz.* the place of the *Ship*. But if that there be no *Parallel* of *Latitude* obſerved on the *Map*, let the *Degrees* intercepted between this *Latitude* and the *Vicine Parallel*, be taken by the interval of the *Compaſs*, on the *Lateral Line*. And let the *Rule* in the *Line* of the *Quarter*, and one *Foot* of the *Compaſs*, be moved together in this *Parallel*, until the other *Foot* of the *Compaſs*, and the noted *Shank* do meet; the Point of the meeting, ſheweth the place of the *Ship*. *Seamen* uſe two Pair of *Compaſſes*.

If that you will determine more accurately by the Calculation of the place demanded on the *Map*, or *Earth* it ſelf, the *Problem* is this: The *Latitude* and *Longitude* of one place being given, and the *Quarter* in which the *Navigation* is appointed to another place, and the *Latitude* of this place given to find his *Longitude*; for the *Latitude* and *Longitude* given is the place it ſelf.

3. The quantity of the *Voyage* performed, from one known place to another unknown, being obſerved, and the *Latitude* of this other being obſerved, to find this other on the *Maps*.

Let the quantity of the *Voyage* performed, be taken by the Interval of the *Compaſs*, from the oppoſite *Scale*. Then if the *Parallel* through the *Degree* of *Latitude* be obſerved on the *Map*; let one *Foot* of the *Compaſs* be placed on the noted place, the other *Foot* on this *Parallel*; This *Point* ſhall be the place demanded. But if the *Parallel* paſs not through the *Degree* of *Latitude*, let one *Shank* of the *Rule* be applied to the *Vicine Parallel*; on the other *Shank* let the *Degree* of *Latitude* be noted, and let the *Rule* be moved until the other *Foot* of the *Compaſs* toucheth the noted Point of the *Rule*. The place of the *Map* ſubject to the Point in this Situation ſhall be the ſought for place of the *Ship*.

If that a more accurate invention is required by *Calculation*, the *Problem* ſhall be this: The *Latitude* and *Longitude* of one place being given, and the diſtance of the other on the *Line* of *Navigation*, and the *Latitude* of this, to find out the *Latitude* of this other. For this being known, when the *Latitude* is obſerved you have the Situation of the place it ſelf on the *Maps*, or *Earth*.

The *4th* and *5th* Method alſo of finding out of this place is alſo given, *viz.* in which the *Longitude* of the other, or ſought for place is ſuppoſed to be obſerved; but the *Latitude* is unknown. But becauſe that very ſeldom the *Longitude* can be obſerved on the *Sea*, therefore this Method is omitted, as uſeleſs: But he that deſireth more concerning this Method, let him read *Snellius*, *Stevens*, *Metius* and others that have treated at large thereof.

Propoſition III.

To conjecture to what Quarter the Ship *is moved, and in what* Rhumb, *although the Signs be fallacious.*

IN this ſolution of the former Propoſition for the finding out the place of a *Ship*, thoſe things as noted were taken and obſerved, 1. The *Quarter* unto which the *Ship* is moved, and the *Rhumb* in which. 2. The way made. 3. The *Latitude* of the place unto which it hath arrived. Now therefore we muſt ſhew how theſe three may be obſerved on the *Sea*, that they may be uſed for the finding out the place; for if that theſe be not rightly known, or obſerved, the true place ſhall neither be found or diſcovered.

First therefore let us ſee concerning the *Quarter* of the *Courſe* of the *Ship*, and the *Rhumb*.

The *Pilots* know the *Quarter* from the *Compaſs*, or *Loadſtone*; For what *Quarter*, or *Rhumb* of the *Compaſs* agreeth with the *Line* of the conceived *Longitude* of the *Ship*, the ſame is put into the *Quarter* of the *Ship* to be moved, and to deſcribe its *Rhumb*. For they ſeldome uſe the

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the *Sign* taken from the *Quarter* of the apparent rising and setting of the *Sun*, which they compute.

These *Signs* may be corrupted by divers causes, so that they may deceive in shewing the *Rhumb*, or *Quarter*. 1. If that the Declination of the *Magnetick Needle*, be uncertain in that place, and therefore the *Quarters* of the *Compass* do not shew the true *Quarters*. 2. If that the *Sea* in that place hath a *Flux* to a certain place; for it will carry the *Ship* from the true *Rhumb*, although the *Ship* be directed to the same *Quarter*: The *Fluxes* and *Refluxes* are the frequent cause of this Error. And in many places of the *Torrid Zone*, a general motion is of force, and in many places a stated and fixed motion from stated *Winds*. 3. *Winds*, especially *Storms* remove the *Ship* from the *Rhumb* of their *Voyage*, although they ply in the same *Quarter*. 4. The *Fluxes* of the *Sea*, which are carried towards other *Quarters*, and carry the *Ship* with it. 5. The *Rudder* and *Helm* cannot be moved by him that steereth unto any *Quarter*, as it ought to be, the *Waves* of the *Sea* obstructing it. All these hinder the *Ship* to be moved in the same *Rhumb*, whose *Quarters* are shewed by the *Compass*. But how much it is drawn aside must be learned by conjecture from the Vehemency of the *Flood*, and of its *Quarter*, and the like; but the *Method* is very imperfect.

Proposition IV.

To cast up the Voyage *made upon the* Rhumb, *to measure it at the given time from the given place.*

Pilots conjecture the same, 1. When they observe or know by experience what *Course* a *Ship* is wont to make, with such a *Wind*. 2. If that they have *Sailed* in the same *Meridian*, or vicine *Line* with any *Wind*, and have observed the *Latitude* of the place, in the beginning of the motion, and the *Latitude* of the place, in the following time. For the difference of *Latitude* turned into *Miles*, sheweth the *Course* made for so long a space of time, and such a *Wind*. Whence for the time given and such a *Wind* continuing, the *Course* made is collected. 3. With more Industry they measure the Course performed by a *Boat* and *String*; one end of which is fastned to the *Boat*, and the other with the *Globe* is in the *Ship*; for the *Ship* remains unmoveable. *Sailing* is permitted to the *Boat* until it be removed 10 or 12 *Orgyas* of the String, and the time elapsed between is observed. And from this, for any time of the performed Course of the *Ship* is found out.

The Signs of the performed *Sailing* of the *Ship* are corrupted, and rendred uncertain by divers Ways; even uncertain of themselves, seeing they are meer Conjectures. 1. Oftentimes the *Ship* makes lesser, or greater Way than the Conjecture affords, *viz.* because in many places of the *Sea* the *Flux* is unto a certain *Quarter*, or the *Billows* are rouled unto a certain *Quarter*. If therefore the *Ship* be directed into the same *Quarter*, the Way made will be greater than the Conjecture maketh it; but if into a contrary it will be lesser. 2. Because the *Ship* is carried by other Causes into other *Quarters*, and so by Windings arriveth at another place. 3. The *Winds* are variously changed. 4. By how much a *Ship* hath the greater *Altitude*, by so much its Motion seemeth more slow, though it be not so.

Proposition V.

To observe the Latitude *of a place to which a* Ship *is arrived.*

The *Sea-men* observe it by the *Sun* in the Day, and by the *Stars* in the Night. They use three *Instruments*, *viz.* the *Astrolabe*, the *Radius*, and the *Triangle*.

Proposition VI.

From whence it is manifest, That the Methods used by Sea-men, *to find the places on the* Maps *to which they have arrived, are fallacious; because that they can neither be certain of the* Rhumb, *or* Quarter *of the Way, or of the Quantity of the Way made, or of the observed* Latitude *of the place: Yet the observation of the* Latitude *of the place unto which they are arrived, because that it is not less subject to Error, especially the* Air *and* Sea *being tranquillous, may be exempted from this Fallacy.*

But from that alone the place it self is not found on the *Map*, or *Earth*, but a second is required, *viz.* either a distance from another place given, or a *Rhumb* by which they Sail from the given place to that; or lastly, the *Longitude* of that place from this. We have said, that the Observation of the Way made, or Distance is uncertain, as also that of the *Rhumb*. Therefore they return back to find out the *Longitude* of the place. For the *Latitude* and *Longitude* of the place being known, the place it self is found on the *Maps*, and determined on the *Globe* of the *Earth*.

Whence it is evident, That the Art of *Navigation* requires the Solution of this *Problem* to the making up of its perfection: *viz.* to find out the *Longitude* of the place where we are at any time, or on any day.

CHAP. X.

Of the Variation of the Weather.

According to the Opinion of *Aristotle*, *Pliny*, and others, the Variation of the Weather proceed from these Reasons: *Viz.* When the *Sun* riseth fair and clear, it denotes a fair Day; but if yellow, or deadish, it signifies a Tempest: When the *Sun-Beams* are red and short at the Rising, Rain proceeds; if the *Clouds*, or *Mists*, make a Circle about the *Sun* or *Moon*, by how much the greater the Circle is, by so much the greater shall the Tempest be; and if there be two *Circles*, the Tempest will be greater: Also at the Rising of the *Sun*, if the *Clouds* are red, 'tis a sign of a great *Tempest*. When the *Moon* riseth bright, and shineth with a pure colour, 'tis a sign of Fair weather; if Red, signifies Wind; and if Black, Rain. If the Horns of the New *Moon* appear sharp, it denotes Fair Weather; but if blunt, otherwise. If the *Sun* setteth Red, it denotes a Fair day; but if the *Heavens* are Red in the Morning, it signifies a Tempest. When a *Cloud* riseth in the West, it shews Rain; and when the *Wind* is in the South, it produceth Heat.

CHAP. XI.

Of TIDES; High and Low Waters.

TIDES by *Mariners* ought to be well and carefully observed, otherwise great dangers may ensue in the entring into *Ports*, passing by *Flats* and the like. Now for the better knowledge of the *Tides*, or the Increase and Decrease of the *Sea*, 'tis agreed that the cause thereof proceeds from the *Moon*, which altereth the *Tides* sooner or later, according to the Age and Variation of the *Moon*. Therefore to give you a Rule how you may (knowing the Age of the *Moon*) find out the *Tides* in any part of the World: Observe this *Rule*; First, Note what *Moon* makes a *Full-Sea* at the place desired, as also the Hour appropriate to the said Point of the *Compass*; which done, multiply the Age of the *Moon* by 4, divide the *Product* by 5, and add to the *Quotient* the *Hour* which makes *Full-Sea* in that place upon the Change Day: If it exceed 12, cast away 12 so often as you may, and the Hour of the *Full Sea* remaineth; and to every *Unite* that remaineth upon your division, allow 12 *Minutes*, which add to the Hours; as if there remaineth 1, add 12 *Minutes*; if 2, add 24; if 3, add 36, and so forth. As for Example, The *Moon* being 12 Days old, to know what Hour 'tis High-water at *London-Bridge*. High-water being at 3 of the Clock, then according to the former Rule, multiply the Age of the *Moon* (which is 12) by 4, which makes 48; which divide by 5, and the *Quotient* will be 9, and 3 remaining, which added to 3, makes 12 *Hours*, 36 *Minutes*, which is the time of High-water at the same place: And by this Rule knowing what *Moon* makes a *Full-Sea* thereat, you may know the *Tides* at any place; and this is to be performed by *Tables* fitted for the purpose.

And seeing that the Alteration of the *Tides* doth proceed through the effects and operation of the *Moon*, it will be necessary to give you her Motions, by which the *Tides* are known.

The *Motions* of the *Moon* are of two kinds, *viz.* a Natural, and a Violent *Motion*: Her Natural Motion is from *West* to *East*, contrary to the Motion of the First-mover, wherein the *Moon* hath three differences of moving, *viz.* a swift, a mean, and a slow Motion, all which is performed in 27 *Days*, and 8 *Hours*, nearest through all the *Degrees* of the *Zodiack*.

Her Violent Motion is from the *East* towards the *West*, and is caused by the violent swiftness of the Diurnal Motion of the *Primum Mobile*, in which Motion the *Moon* is carried about the *Earth* in 24 *Hours*, and 50 *Minutes*, nearest one day with another; for although the Diurnal Period of the First-mover be performed in 24 *Hours*; yet because the *Moon* every day in her slowest Natural Motion moveth 12 *Degrees*, therefore she is not carried about the *Earth* until that her Motion be also carried about, which is in 24 *Hours*, and 50 *Minutes* nearest.

Her slow Motion is in the Point of *Auge*, or *Apogeo*, as being then farthest distant from the *Earth*, and then she moveth 12 *Degrees* in every Day.

Her swift Motion is in the Opposite of the *Auge*, or *Apogeo*, and then is nearest to the *Earth*, at which time she moveth 14 *Degrees* in every Day, or 24 *Hours*, with some few *Minutes* difference. And so between these two Points is her mean Motion, and then she moveth 13 *Degrees* nearest.

In every 24 *Hours* the *Moon* departs from the *Sun* 12 *Degrees*, or 48 *Minutes* of time, and in this Separation she moveth from the *Sun* Eastwards, until she be at the Full; for between the *Change* and the *Full* it is called the *Moons* Separation from the *Sun*; so that between the *Full* and the *Change* 'tis called the *Moons* Application to the *Sun*, in which time of Application she is to be Westward of the *Sun*, as in her Separation she is to be Eastward.

Then if the *Moon* doth move 48 *Minutes* of time in 24 *Hours*, it is plain that she moveth 24 *Minutes* in 12 *Hours*, which is 2 *Minutes* in every *Hour*. And such as is the difference of her Motion, such is the Alteration of the *Tides*, so that every *Tide* differeth from the former 12 *Minutes*; because there is 6 *Hours* between *Tide* and *Tide*, and in every *Hour* the course of *Flowing* and *Reflowing* altereth 2 *Minutes*, by which it is visible, that in 24 *Hours* the 4 *Tides* of *Ebbing* and *Flowing* differ 48 *Minutes* of time.

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CHAP. XII.

Sheweth how to work your Observation, made at any STAR *that riseth or sets.*

THe Rule for the *STARS* is the same as for the *Sun*, there being no difference, but in the *Declination*. Therefore for a General *Rule* observe, The *Declination*, which is of contrary denomination; As for Example, that which is South when you are in North *Latitude*, or North when in South *Latitude*, is to be subtracted from the *Complement* of the *Meridian Altitude*, except you are between the *Æquinoctial* and the *Star*; or that the *Stars Declination* is greater than its Distance from your *Zenith*; for in such case the *Complement* of the *Stars Altitude*, or *Zenith Distance* from the *Declination* of the same *Star* is to be *subtracted*, and the Remainder will be the Distance of your *Zenith* from the *Æquinoctial*, which is your *Latitude*.

Note, That the *Stars* that set not, come also to the *Meridian* under the *Pole*, and then their *Altitude* is least of all. For to know when a *Star* draws near the *Meridian* under the *Pole*, take a *Plummet*, or a *Thread* with *Lead* at the end, and hold it so that it cuts the *North Star* in the middle; and if the *Star* you observe begins to draw near the *Thread*, it will not be far from the *Meridian*. Observe then its *Altitude* several times, until you find it ascend or rise; for the least of all will be the *Stars Meridian Altitude*, to which if you add the *Complement* of its *Declination*, or *Pole Distance*, you shall have the height of the *Pole*.

If you observe the *Meridian Altitude* of a *Star* that sets not when it is above the *Pole*, whose height you would know, only subtract the *Complement* of that *Stars Declination* from its highest *Meridian Altitude*, and the Remainder is the height of the *Pole*.

The Height of the *Pole* of the *Stars* may be known without their *Declination*, or *Pole Distance*, and that after this manner: Observe the highest and lowest *Meridian Altitude* of a *Star* that doth not set, and add them together, the half of the Sum will be the height of the *Pole*.

The same is to be understood of any *Star* that doth not set, as well in South as in North *Latitude*: But you must not alter your *Parallel* until both Observations are made; for if you should Sail by any other *Rhumb* than East or West, it will cause some Error, which will be so much the greater the further you are from the *Parallel* of your first Observation, when you observe the lowest *Altitude* of the *Star*.

CHAP. XIII.

Of the North, *or* Pole-Star, *with a Table of its Distance from the* Pole-Artick, *for the four Chief Points of the* Compass *the Guards are upon; as also to know when the Guards are upon each Point of the* Compass *named on the said Table.*

THe *POLE-STAR* is so called, as being neareſt to the *North-Pole*, from which it is distant 2 *Deg.* 22 *Min.* This *Star* hath a flower Motion than any other, as having a lesser Circuit to move in, which it finisheth in 24 *Hours*, as all other *Stars* do theirs.

The TABLE.

When the brighteſt of the *Guards* is		D.M.	
North, subtract		2. 4.	from the *Pole-Star Altitude.*
East, add		1.10.	to the *Pole-Star Altitude.*
South, add		2. 4.	to your *Observation* at the *North-Star.*
West, subtract		1.10.	from the *Pole-Star Altitude*; and the Remainder will be the *height* of the *Pole*, or *Latitude* you are in.

For your knowing which of the 4 *Points* of the *Compass* the *Guards* are upon from the *North-Star*, Suppose a *Line* drawn from your *Zenith* through the *Pole-Star* to the *Horizon*, and that shall be a *Line* of North or South, by which you shall know when the *Guards* are North or South; For when you perceive the brighteſt of the *Guards* exactly on that *Line* under the *Pole-Star*, you may conclude that the *Guards* are North; but when the brighteſt of the *Guards* is on the same *Line* perpendicularly above the *Pole-Star*, then the *Guards* are South; as for the other two *Points* set down in the *Table*. Suppose likewise a *Line* of East and West drawn *Parallel* to the *Horizon* through the *Pole-Star*; and when you see the brighteſt of the *Guards* on that *Line* with the *Pole-Star*, and to the Right-hand, you may conclude the *Guards* are East or West.

For

For the finding the *height* of the *Pole-Artick* by the *North-Star*, and the *Guards*, you must stay until the brighteſt of the *Guards* be exactly upon one of the *Points* of the *Compass* set down in the *Table*, (*viz.* either *East*, *West*, *North*, or *South*, for the *Pole-Star*) that being the best time to observe the *Altitude* of the *North-Star*; to which if you *add*, or *subtract* what the *Table* sheweth, you shall have the height of the *Pole*.

Note, That the *Guards* are East or West, when you find that the brighteſt of them is neither higher, or lower than the *North-Star*; which may be soon discovered by the *Cross-Staff*, or *Quadrant*, by observing the *Altitude* of the *North-Star*.

DYALLING,

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DYALLING, OR HOROGRAPHY.

CHAP. I.

The several Sorts of SUN-DYALS.

DYALS are either moveable, being such that may be carryed about them, as the *Cylinder* and certain little *Boxes*, whose *Needle* (like *Indexes*) are touch'd with the *Load-Stone*; or Immoveable, that is, fixt to some certain place. They are also *Regular*, or *Irregular*; *Regular* are those that are described in a Plain, disposed towards some one determined principal part of the *World*; For Example, direct East, or direct West. The *Irregular* are those which do not directly point to those principal parts of the *World*, but rather decline from them.

1. Of those *Regular*, the first is the *Horizontal*; the second, the *Vertical Southward*; the third, the *Vertical Northwards*; the fourth, the *Meridian East*; the fifth, the *Meridian West*; the sixth, the *Æquinoctial* above; the seventh, the *Æquinoctial* below; the eighth, the *Polar* above; and the ninth, the *Polar* beneath.

The *Horizontal* is that which is Æquidistant towards the *Horizon*.

The *Vertical* is that which is perpendicularly erected above the *Horizon*, and tends directly towards the *Vertical Point*, and it is *Parallel* to the *Primary Vertical Circle*, and this is double, viz. *North Vertical*, as looking towards the other which is *South Vertical*.

The two *Meridians*, viz. the *Eastern and Western*, each of them have their several ways which are Æquidistant from the *Meridian Circle*.

The two *Æquinoctials* are those which each of them their several ways are Æquidistant from the *Æquator*, the one above, the other beneath the *Horizon*.

The two *Polars* are those which each of them their several ways, the one above, the other beneath, are *Parallel* to the *Axis* of the *World*.

The *Irregular* are either *Declinant*, or *Inclinant*.

The *Declinant* is that which is Æquidistant from any *Vertical Circle*, and it is therefore also not amiss called *Vertical*; but it declines from the *Primary Vertical* which is proporly so called, and it is of two sorts; for there is one which declines from the *South*, either to the *East*, or *West*; and another that declines from the *North*, either to the *East*, or *West*.

The *Inclinant* is that which falls off from the *Vertical Point*, and *Inclines* towards the *Horizon*, as being not Æquidistant from it.

In respect of the *Hours*, *Dyals* are divided in *Astronomical*, *Italick*, *Babilonick*, *Antient*, or *Judaick*.

The *Astronomical* declares equal *Hours* from *Noon* to *Midnight*, and from *Midnight* to *Noon* again; and it is principally in use all over *Europe*.

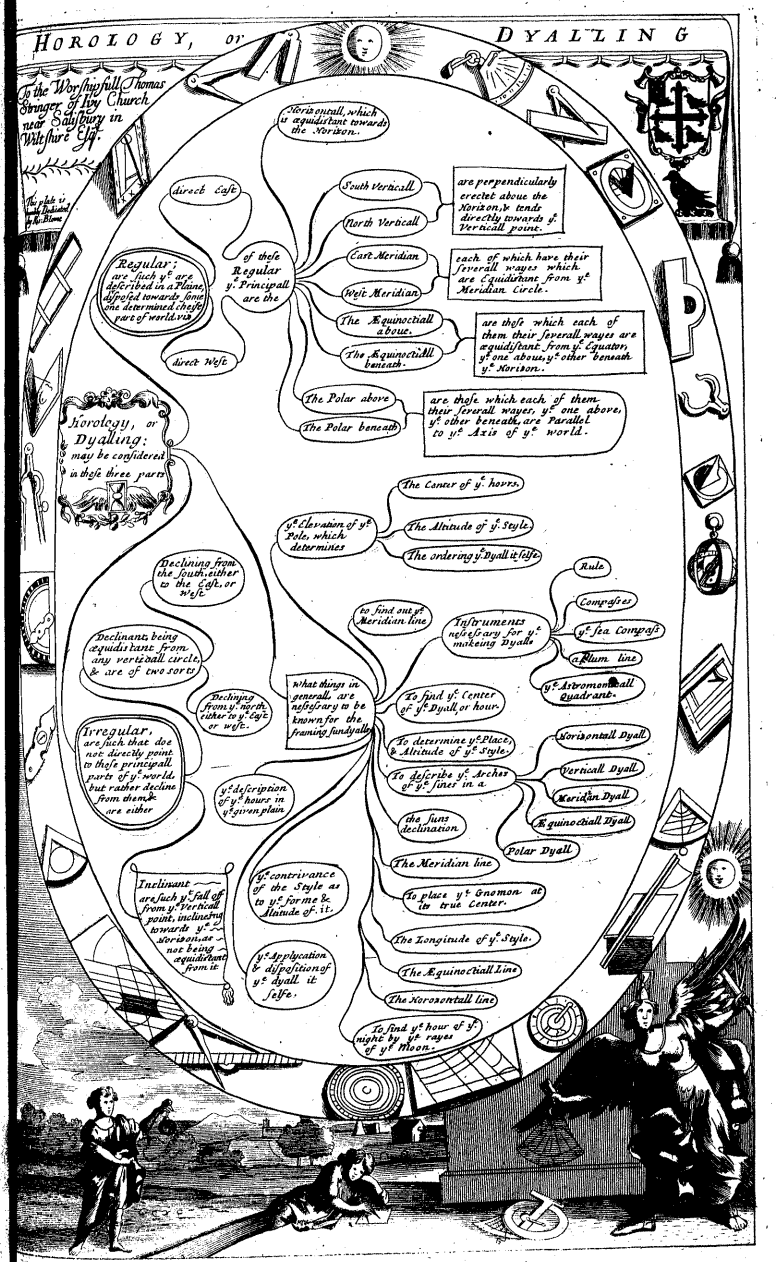
The *Italick* reckons equal *Hours* from *West* to *West*, so as that of the 24 *Hours*, that is said to be the first *Hour* which is the *Hour* of the *Suns setting*, and this would be called by us the 6*th*, 7*th*, or 8*th Evening Hour*, whereas on the contrary the *Babilonick* reckons equal *Hours* from *Sun-rising* to *Sun-rising*.

The *Ancient*, or *Babilonick* reckons unequal *Hours*, as *Chronology* shews more at large. I shall therefore treat only of *Astronomical Dyals*, because the knowledge of them leads to all the rest.

CHAP. II.

What things in General are necessary for the Framing of a SUN-DYAL.

1. THE *Elevation* of the *Pole* is to be known, by which we are to determine of the *Center* of the *Hours*, the *Altitude* of the *Style*, the ordering of the *Dyal* it self, and all other things of that nature. Also the way of finding the *Meridian Line* is to be known, to the end the *Meridian Line* of the *Dyal* may be rightly placed under the *Meridian* of the place assigned. The *Artist* must also be furnish'd with a *Rule* and *Compass*, as also with an *Astronomical Quadrant*, rightly


HOROLOGY, or DYALLING
To the Worshipfull Thomas Bringer, of Ivy Church near Salisbury in Wiltshire Esq.
Horizontall, which is equidistant towards the Horizon.
Direct East
South Verticall
North Verticall
are perpendicularly erected above the Horizon, & tends directly towards ye Verticall point.
Regular; are such y^t are described in a Plaine, disposed towards some one determined chiefe part of world viz.
of these Regular ye Principall are the
East Meridian
West Meridian
each of which have their severall wayes which are Equidistant from ye Meridian Circle.
The Æquinoctiall above.
The Æquinoctiall beneath.
are those which each of them their severall wayes are equidistant from ye Equator, y^t one above, ye other beneath ye Horizon.
Direct West
The Polar above
The Polar beneath
are those which each of them their severall wayes, y^t one above, ye other beneath, are Parallel to ye Axis of ye world.
Horology, or Dyalling: may be considered in these three parts.
The Center of ye hours.
ye Elevation of ye Pole, which determines
The Altitude of ye Style.
The ordering ye Dyall it selfe.
Declining from the South either to the East, or West.
Rule
Compasses
ye Sea Compass
a Plum line
ye Astronomicall Quadrant.
to find out ye Meridian line
Instruments necessary for ye making Dyalls
Declinant, being equidistant from any vertecall circle, & are of two sorts
what things in generall are necessary to be known for the framing fundyalls
Declining from ye north either to ye East or west.
To find ye Center of ye Dyall, or hour.
Horizontall Dyall
Irregular, are such that doe not directly point to those principall parts of ye world, but rather decline from them & are either
To determine ye Place & Altitude of ye Style.
Verticall Dyall
To describe ye Arches of ye hours in a
Meridian Dyall
ye description of ye hours in ye given plain.
Æquinoctiall Dyall
the suns declination
Polar Dyall
The Meridian line
Inclinant are such y^t fall off from ye Verticall point, inclineing towards ye Horizontall not being equidistant from it.
ye contrivance of the Style as to ye forme & Altitude of it.
To place ye Gnomon at the true Center.
The Longitude of ye Style.
ye Application & disposition of ye Dyall it selfe.
The Æquinoctiall Line
The Horizontall line
To find ye hour of ye night by the rayes of ye Moon.

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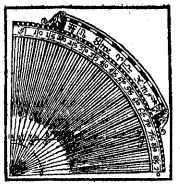
rightly divided into 90 *Degrees*, and wherein alſo there is rightly to be deſcribed the *Horary Line* according to the *Scheme*; together with the *Horary Points*, alſo according to the *Scheme*.



2. To perfect this *Sun-Dyal* three things in general are neceſſary; firſt, The deſcription of the *Hours* in the given *Plain*; Secondly, The contrivance of the *Style*, that is, as to the *Form* and *Altitude* of it, and in what place it ought to be fix'd; And, Thirdly, The *Application* and *Diſpoſition* of the *Dyal* it ſelf thus finiſh'd.

It is to be noted, firſt in general for the deſcribing of the *Hours*, that there are commonly preſuppos'd two right *Lines* cutting each other Croſs-ways to right *Angles*, whereof the one is the *Meridian Line*, or *Line* of the 12*th Hour*; the other is the *Occult Line*, which cuts the firſt Croſs-ways to *right Angles*: And this is alſo vulgarly called the *Line* of *Hours*, becauſe therein are deſigned the *Horary Points*; but more properly the *Æquinoctial Line*, becauſe it repreſents the *Æquinoctial Circle*, which is the *prime Rule* of all *Hours*.

Note, Secondly, That all *Hours* (at leaſt *Aſtronomical*, or *Equal*, are diſtinguiſhed proportionably among themſelves by an Interval of 15 *Degrees* orderly towards the *Æquinoctial Circle*; becauſe in the ſpace of one of theſe *Hours* the *Sun* runs 15 *Meridians*, which paſs through ſo many *Degrees* of the *Æquator*, whereupon an *Aſtronomical Hour* is thus deſin'd. An *Hour* is the Space of Time, in which the *Sun* runs through 15 *Meridians*, or in which 15 *Degrees* of the *Æquator* aſcend above the *Horizon*, as hath been before obſerved.

Note, Thirdly, That there is need of a *Plum-Line*, or Perpendicular, for the right placing and ordering of the *Dyal*, the better to examine whether it be *Parallel* to the *Horizon*, or *Perpendicularly Vertical*, &c.

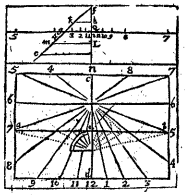
CHAP. III.

To Frame an HORIZONTAL-DYAL.

FRom what hath been ſaid in the former *Chapter*, 'tis to be concluded that three things are to be performed; Firſt, The deſigning of the *Horary Points*; Secondly, To find the *Center* of the *Hours*, from which the *Hours*, *Circles*, or *Lines* are to be drawn through *Points* already found: And, Thirdly, the fixing the place of the *Style*, and its *Altitude*. All which will be more diſtinctly ſet forth in theſe following *Problems*.

Problem I.

To Deſign the Horary Points.



DRaw two *Lines Croſs-ways*, *viz.* the Line *a*, *b*, (according to this *Figure*) which is to be the Line of the 12*th Hour*, and alſo the obſcure *Line c*, *d*, which is to be the *Æquinoctial*, and to be expunged ſo ſoon as the *Dyal* is compleated.

Next, from the *Aſtronomical Quadrant*, or *Semicircle*. For the purpoſe; Let the *Horary Points* be transferred by the help of the *Compaſs* to the ſaid *Æquinoctial Line*; that is to ſay, Let thoſe Points by a convenient extenſion of the *Compaſs* be taken off from the Inſtrument, by fixing one *Foot* of the *Compaſs* in the *Concourſe* of the *Meridian*, and *Æquinoctial Line*, and extending the other to the Spaces of the Hour ſought; then keeping that extenſion, deſign the ſought Points in the *Dyal*, fixing the ſame Foot of the *Compaſs* likewiſe in the *Concourſe* of the *Æquinoctial* and *Meridian Line* of the ſaid *Dyal*.

Obſerve, That the *Morning-Hours* are drawn in that part which is next the Right-hand, the *Evening-Hours* in the oppoſite part. Note, Secondly, That in this *Æquinoctial Line* there are only found of the *Morning-Hours*, 11; 10, 9, 8, 7; of the *Evening*, 1, 2, 3, 4, 5. Note, Thirdly, That after the *Center* of the *Hours* is found, the deſcription of the reſt will of courſe be very eaſie, as hereafter ſhall be ſhewed.

Problem II.

To find the Center of the Dyal, or of the Hour.

HEre chief regard is to be had of the *Elevation* of the *Pole*; for not any *Dyal* of this ſort will declare the *Hours* in any place, but only under a certain *Elevation* of the *Pole*, which belongs to that *Region* for which the *Dyal* is made.

Suppoſe that in this *Region* or *Countrey*, the *Pole* be elevated 49 *Degrees*, which is 41; then place the Foot of the *Compaſs* in the *Center* of the *Inſtrument*, and extend the other Foot from

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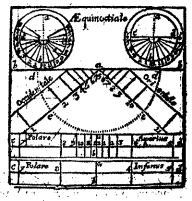
thence to the *Æquinoctial Line*, described in the said *Instrument*, in which part the 41*th Degree* is cut by the *Radius*, numbring from the *Line* of the 12*th Hour*. This extension of the *Compaſs* transfer upon the *Dyal*, fixing one Foot of the *Compaſs* in the Concourſe of the *Meridian*, and *Æquinoctial Line*, viz. *e*; the other fix in a part of the *Meridian Line*, that is, in *f*, and determine that point to be the *Center* of the *Hours*; for from thence, and through each point mark'd in the *Æquinoctial Line* are all the *Lines* to be drawn, which ſome call the *Arches* of the *Hours*, as in the *Scheme* doth appear.



But there is alſo to be drawn through that *Center* of the *Hours* a *Line Parallel* to the *Æquinoctial*, which is to be the *Line* of the 6*th Hour* both for *Morning* and *Evening*. Alſo the *Lines* of the *Hours* IV and V in the *Evening*, are to be drawn out beyond the *Center* of *Hours*; for the *Hours* IV, and V in the *Morning*, (in like manner as the *Lines* of the *Hours* VII and VIII in the *Morning*) are to be drawn further out to deſign the *Hours* VII and VIII in the *Evening*. Thus you have a perfect deſcription of an *Horizontal Dyal*, which may be drawn in what *Figure* you pleaſe, and may ſet down the *Characters* of the *Hours* at the ends of the *Lines*: Then the *Æquinoctial a, b*, is to be expunged.

Problem III.

To determine the Place and Altitude of the Style.

NOt only the *Center* of the *Hours* in theſe ſorts of *Dyals*, but alſo the place of the *Style* is in the *Meridian Line*

Note, Firſt, That this *Style* is commonly Triangular, and its *Baſis* lyeth upon the *Meridian Line*, and terminates in the *Center* of the *Hours*, but it riſes in *Altitude* towards the *Æquinoctial Line*, as is obſerved in the *Scheme* of the firſt *Problem*.

Note, Secondly, That this *Style* hath no determined *Altitude*, except in reſpect of the place in which it is fixt; for one part of the *Baſis* of that *Triangle* being Plac't in the *Center* of *Hours* that is in *f*, by how much this *Baſis* ſhall be, whence conſequently the other part of this ſide will be more diſtant from the *Center*; ſo much the more is the *Altitude* of the *Style* to be, and ſo much the bigger will the whole *Triangle* be. Thus the *Triangle o,n,f*, or *m,h,f*, or *g,e,f*, will be bigger than *k, b,f*. Moreover ſuch ought to be the *Altitude* of the *Style* that the ſide *f, o*, which is ſubtended to the right *Angle u*, or *l*, or *h*, may agree with the *Axis* of the *World*, and tend directly to the *Pole*. And it is therefore called the *Axis*, becauſe it agrees with the *Axis* of the *World*; and that ſide only, or ſhadow projected from it deſigns the *Hours*. Therefore that a fit *Altitude* of this nature may be had.

Note, Thirdly, That the *Degrees* of the *Poles Altitude* ought to be numbred, and recourſe had to the *Inſtrument*, by fixing the Foot of the *Compaſs* in the *Center* thereof, and then extending the other to that part of the *Æquinoctial Line* wherein the *Radius* cuts that *Degree*, which anſwers to the number of *Degrees* of the *Poles Elevation*; For Example; Suppoſing that in this Countrey the *Pole* is Elevated 49 *Degrees*, the Foot of the *Compaſs* ought to be extended to that part wherein the 49*th Degree* is cut by the *Radius*, numbring from the *Line* of the 12*th Hour*. This extenſion of the *Compaſs* being made, is to be transferred to the *Dyal* in this manner; fix one *Foot* of the *Compaſs* thus opened in the *Concourſe* of the *Æquinoctial*, and *Meridian Lines*, that is, in *e*; then with the other *Foot* mark in the *Æquinoctial Line* the Point *g*. Laſtly, from *f*, the *Center* of the *Hours* draw through the ſaid Point *g*, the *f, k, g, m, o*, without ſtint: This will give the ſought *Altitude* of the *Style*; for if the *Baſe* be only *f, h*, the whole *Style* and its *Altitude* will be *f, h, k*: Otherwiſe if the ſaid *Baſe* be extended to *e*, the *Style* will be *f, e, g*; if to *l*, the *Style*, will be *f, l, m*; if to *n*, the *Style* will be *f,n,o*, and ſo *ad infinitum*.

Note, Fourthly, That the *Angle* which the ſaid *Axis* makes at the *Center* of the *Hours*, in the *Horizontal Dyal* hath always the *Degrees* of the *Poles Elevation*; and conſequently that in our *Hypotheſis* this *Angle* is in 49 *Degrees*.

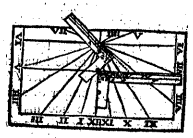
Note, Fifthly, If in place of a *Triangular Style* there ſhould be only a right *Style* erected, ſuch as would be *b, k*, or *e, g*, or *l, m*, or *n, o*, the extremity of it only would ſhew the *Hours* by the Shadow projected from it. But obſerve that the *Horizontal Dyal* thus finiſh'd ought to be ſo ordered and diſpoſed in its proper place; firſt that it be *Parallel* to the *Horizon*, which is tryed by the uſe of a *Plum-Line*, or *Level*; and ſome try it by caſting in *Quickſilver*; for if the *Plane* incline never ſo little, the *Quickſilver* will ſlide into that part. Secondly, the *Line* of the *Hour* XII is exactly to be plac'd within the *Meridian* of the ſaid place, which *Meridian*, how it is to be found, hath been already declared.

CHAP. IV.

To Draw an Horizontal Dyal *by another Method.*

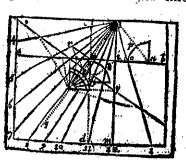
ALthough the precedent Method ought not to be unknown to any *Horographers*, as being (as it were) the *Baſis* and *Foundation* of all *Horography* by proper and apparent *Principles* of the ſaid *Praxis*; yet there are others (which being of more expedition) may very aptly be made uſe of, as well for advantage as delight.

The firſt is by the help of a *Rule*, uſually called a *Square*, in which are to be inſcribed the *Degrees* of the *Aſtronomical Quadrant*, with a fit *Center* to the oppoſite ſide; which *Figure* is here ſet down.



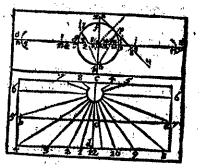
In this *Rule*, rightly placed beneath the *Æquinoctial Line*, and by the *Meridian* a *Thread* being drawn from the *Center* through 15 *Degrees* mark'd in the Rule, the *Horary Points* are deſigned in the *Æquinoctial Line*. Then the *Center* being plac'd in the *Concourſe* of the *Meridian* and *Æquinoctial Lines*, It is brought about until it touch the *Meridian* near the *Degree* of the *Complement* of the *Poles Elevation*, to find thereby the *Center* of the *Hours*. Laſtly, The *Rule* being applied near the *Meridian Line*, and the *Longitude* of the *Æquinoctial*, a point at the *Degree* of the *Poles Elevation*, from whence through the *Center* of the *Hours* the *Axis* is to be drawn to find the *Altitude* of the *Style*.

The ſecond Method, is by an *Aſtronomical Quadrant*, which is alſo called an *Æquinoctial Arch*, or *Quarter* of a *Circle*; becauſe it is ſuppoſed to have a *diviſion* through 15 *Degrees*, as it is obſerved in this *Scheme*; where you ſee how it ought to be diſpoſed by the *Meridian-Line* under the *Æquinoctial*, and how by a *Thread* drawn from its *Center* through 15 *Degrees*, the *Horary Points* are mark'd in the *Æquinoctial Line*. Then the like *Arch* being drawn out of the *Concourſe* of the *Æquinoctial*, and *Meridional Lines* in *e*, from the Point in which it touches the *Æquinoctial Line*, mark in that *Arch* the *Degree* of *Elevation*, that is, 49. Next, through that *Point* from the *Center e*, draw a right *Line*, through which (at the Section of the ſaid *Arch*) let another right *Line* be drawn at right *Angles* at no limited extent. This in the *Meridian Line* will mark out the *Center* of the *Hours*, and will be inſtead of an *Axis*, to determine the *Altitude* of the *Style*.



CHAP. V.

With one Opening of the Compaſs *to deſcribe an* Horizontal Dyal.



ACcording to this *Scheme*, the two *Lines*, *viz.* the *Meridian*, and the *Æquinoctial*, being drawn Croſs-wiſe to right *Angles*; then opening the *Compaſſes* at pleaſure, deſcribe a blind *Circle* from the common Section of the ſaid double *Line*, mark'd on one ſide the point of the *Hour* 3, and on the other the point of the *Hour* 9. Then, Firſt, From the point *f*, ſtill at the ſame opening of the *Compaſs*, mark in the Circumference of the *Circle* here and there the Points *l*, and *p*. Secondly, From the point *l*, mark the point *m*, in the *Æquinoctial Line* for the *Hour* 4. Alſo, by fetching about the Point of the *Compaſs* to a ſecond remove; at the ſame opening from the ſaid Point of the *Hour* 4, along this *Æquinoctial Line*, mark the point *n* for the *Hour* 5; and then from the *Compaſs* (being four times fetch'd about) as far as the point *o*, mark the *Hour* 11. Thirdly, Do the ſame again on the oppoſite ſide, that is, firſt from the point *p*, mark the point *q* in the *Æquinoctial Line* for the *Hour* 8; then from the ſaid point, the Foot of the opening of the *Compaſs* being twice meaſured to *r*, mark the point of the *Hour* 7: Afterwards, from the ſaid point of the *Hour* 7, the opening of the *Compaſſes* being four times meaſured to 5, mark the point of the *Hour* 1; but the *Hour* 12 is inſerted in the Interſection of the *Meridian*, and *Æquinoctial Lines*. This done, there remains only to be found the points of the *Hour* 2 on the one ſide, and 10 on the other. Proceed therefore thus; From the point *h*, draw a faint right *Line* on the one ſide to the point *l*, the Section in *j* will mark the *Hour* 2; on the other ſide another from *b* to *p*, which will in like manner deſign the *Hour* 10. In the Interſection of the *Æquinoctial* at the point *n*. Laſtly, To find the *Center* of the *Hours*, and the *Axis*, ſeek in the *Arch f, j*, the *Degrees* of the *Poles Elevation* from the point *j*; alſo through the *Degree* of the *Poles Elevation* draw a right *Line* from *c*, the *Center* of the *Circle*; and then through that *Line*, draw at right *Angles* another right *Line z, p, q*. This will determine the *Altitude* of the *Style*, and on the other ſide will mark the *Center* of the *Hours* in the Section of the *Meridian Line*.

CHAP.

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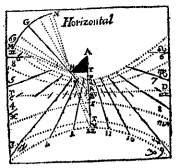
CHAP. VI.

To describe the Arches of the Signs in an Horizontal Dyal.

THE *Arches* of the *Signs* are those *Lines* drawn in *Dyals*, which by the benefit of a *Shadow* projected from the *Gnomon*, shew in what Sign, or part of the *Zodiack*, the *Sun* is; as also how the *Elevation* of the *Pole* being given, the length of the *Days* may at that time be known, and this is commonly set down at the end of these sort of *Arches*.

Note, That the *Arches* of *Cancer* and *Capricorn* describe on each side the *Longitude* of the *Horary Line*, to which the Shadow of the *Gnomon* extends it self; by which means the *Dyal* receives thence its proper *Figure*, as appears by this *Scheme*.



And all this is to be performed by an easie Method, proceeding as follows:

First, The *Horary* being drawn, with the Intervals of each middle *Hour*; Suppose the place of the *Style* to be in *j*. the *Altitude* of the *Style* to to be *b, j*, the *Apex*, or *Point* of the *Style* it self to be *b*, the *Center* of the *Hours* to be in *a*. These things thus granted. First, Draw the right *Line H, E*, perpendicular to the *Axis A, H*, and so as to fall upon the point *H*. Secondly, Through the point *E*, where it cuts the *Meridian*, draw at right *Lines C, E, D*, which is to be the *Æquinoctial Line*, or as it were the *Arch* of *Aries* and *Libra*. Thirdly, Extend the *Line E, H*, at pleasure, viz. as far as *G*, this is to be called the *Radius* of the *Æquator*. Fourthly, From the point *H*, draw at pleasure the *Arch M, G, N*. Fifthly, From the point *G*, towards *M*, and *N*, mark the points of the *Solar Declinations*, that is; how far the *Sun* declines at his entrance into each sign. These *Declinations* are found by the use of a *Quadrant* divided into 90 *Degrees*, by which also draw an *Arch* by opening the *Compasses* to that extent: Then bring the *Compasses* to the extent of 23 ½ *Degrees*, applying that Interval to the *Arch* of the *Dyal*, so as to mark on the one side, and the other the *Points* both of *Cancer* and *Capricorn*, placing the other *Foot* of the *Compaß* in the point *G*, and so proportionally mark on the one side the point of *Taurus*, and on the other that of *Scorpio* at the Interval of 11 *Degrees*, 50 *Minutes*, and in like manner at the Interval of 20 *Degrees*, 12 *Minutes*, mark the points of *Gemini*, and *Sagittarius*.

Apply the *Rule*, or *Thread* to each point of these *Polary Declinations*, and at the same time to the point *H*, and so doing, observe in what point the *Rule*, or *Thread* touches the *Meridian Line*, marking at the same time three several *Points* beneath, and three above the *Æquinoctial Line*: For these are the points through which the *Arches* of the *Signs* are to be drawn. The three uppermost *P, Q, R*, serve for the *Summer Signs*, and the three lower *S, T, V*, for those of the *Winter*.

It is to be understood, that by these points of the *Meridian Line* are to be found the points of the *Arches* in the *Lines* of other *Hours*; yet so as that by the point proper to each *Sign* all the points of the opposite side may be found. Thus by the *Point P*, proper to *Cancer*, will be found all the points through which the *Arch* of *Capricorn* is to be drawn; and on the contrary, through the *Point V*, proper to *Capricorn*, all the points will be found by which the *Arch* of *Cancer*, is to be described. All which the better to exemplifie;

First, for the describing of the *Arch* of *Cancer*, apply the *Rule*, or *Thread* to the point *V*, which is the point of *Capricorn*; then on the other side apply the same *Rule*, or *Thread*, to the Point of the Middle *Hour*, which is next after the Point of the *Meridian Hour*, designed in the *Æquinoctial Line*; then where the *Rule*, or *Thread* cuts the *Line* of the first *Hour*, there mark a Point. Then the *Rule* being still plac'd in the Point *V*, draw through the Point of the *Hour j*, set down in the *Æquinoctial Line*. Having so done, observe in what part it touches the *Line* of the *Hour* 11; and there also mark a Point, still following the foregoing Method, to keep the *Rule*, or *Thread* in the same Point *V*; at the same time the said *Rule* being applied to the Intervals of the following Middle *Hours*. Let the Points be mark'd in other *Horary Lines*, and so you will have all the *Points*; which being connected together by certain crooked *Lines*, will give the *Arch* of *Cancer*.

Just in the same manner you may describe the *Arch* of *Capricorn* from the Point *Cancer* in *P*, extending the *Rule*, or *Thread*, to each Middle *Hour* mark'd in the *Æquinoctial Line*.

CHAP. VII.

To make a Vertical Dyal.

THis is drawn in the same manner on a Regular *Wall*, and hath the same kind of *Style* as the *Horizontal*; however, they differ not only in Situation, but also in this, that in the *Vertical* (for the finding the *Center* of the *Hours*) the *Degrees* of the *Polar Elevation* are taken; and for the *Altitude* of the *Style*, only the *Degrees* of the *Complement*; whereas in the *Horizontal* it is quite contrary. But since there is a distinction here to be, between a *Vertical* to the *South*, and a *Vertical* to the *North*, It is to be observed, First, That the *Vertical* to the *South* hath the *Center* of the *Hours*, and its *Style*, upwards, and shews the *Hours* from 6 in the *Morning* to 6, at *Noon*. Secondly, That the *Vertical* to the *North*, is (as it were) a *Meridional* inverted; for it hath the *Center* of *Hours* downwards, and falls short in shewing the *Hours*. For in some parts of *France*, it shews but from 4 to 8 in the *Morning*, and likewise in the *Afternoon* the same number of *Hours*, and no more. In like manner altogether are described the *Arches* of the *Signs* in a *Regular Vertical Dyal*, as in an *Horizontal*.

CHAP. VIII.

To frame a MERIDIONAL DYAL, either to East or West.

A *Scheme* of both these are already treated of in *Chapter* III, *Problem* II. But first of the *Meridian East Dyal*: First, Draw the *Line a b, Horizontal*, or *Parallel* to the *Horizon*. Secondly, From *a*, draw a slight *Circle* at any opening of the *Compasses*, beginning from the *Horizontal Line*, namely from *b*, and that towards the right side where the *Oriental Dyal* is to be drawn. Thirdly, Seek, or imagine in the *Instrument* the like *Arch*, that is, at the same opening of the *Compaß*, then in that *Arch* cut off the *Complement* of the *Poles Elevation*, or which is the same, the *Elevation* of the *Æquator*; and transfer that *Interval* to the Circle drawn from the point *d*, and let the *Arch* be cut off; For Example, in the point *e*. Fourthly, through that point *e*, and through the extremity of the *Horizontal Line a, b*, draw the *Line e, a*, which will be in the Head of an *Æquinoctial Line*, because therein are to be designed the *Horary Points*. But before the marking of these points, draw another *Line Parallel* to that *Æquinoctial*. Fifthly, About the upper part of the *Æquinoctial Line* mark at pleasure the *Hour* 6, and also the like point in the opposite *Parallel*, so as that between these points the *Line* of the *Hour* 6, be made at right *Angles*. (*Note that this* Hour 6 *is the beginning of the* Hours *in this kind of* Dyal, *and that their Intervals are taken from it. Also, that the place of the* Style *is therein, which is to be fixt in the upper part of that* Line, *that is, where it goes under within the Horizontal.*) Sixthly, From the *Horizontal Dyal*, or from the *Instrument* transfer hither the *Intervals* of the *Hours*, and first the *Distance* of the *Hour* I, from XII; which is found in the *Horizontal*, or in the *Instrument*, will be in this place the *Interval* of the *Hour* V, on the one side, and on the other, of the *Hour* VII; also the Distance of the *Hour* XII from II, will mark the *Hour* VIII; also the Distance of the *Hour* III, will be the *Interval* of the *Hour* IX; and likewise the Distance of the *Line* of the *Hour* VI, of this *Dyal*; and the same proportional Distance is to be between the *Hour* V, and XI.

It is to be understood that the same *Horary Points* which are mark't in the *Æquinoctial Line*, are also to be mark't in the *Parallel*, opposite to it, to the end the *Parallel Horary Lines* may be commodiously drawn from *Point* to *Point*.

Note, Secondly, That the first *Hour* of the *Sun*, which appears in this sort of *Dyal*, is V, and so forwards as far as II, inclusively; for XII cannot well appear, when as the *Dyal* is supposed to be within the *Meridian Circle*.

Note, Thirdly, That the *Style* in this *Dyal* is a right *Index* of a determined *Altitude*, and is fetcht from an *Interval* which is found between the point of the *Hour* VI, and the point of the *Hour* IX.

Now as for the *Meridian West Dyal*, it differs not much from the *Meridian East Dyal*, except that the occult *Arch*, which is for distinguishing the point of the *Æquinoctial Line* is drawn from the left side; and that in the *West Meridian* the *Evening Hours* are to be drawn beginning from the First to the 7th inclusively, with the like *Intervals*, as in the *East Meridian*: but the First is in the lower place, and so the rest in their order. Moreover, the *Hour* VI, is the place of the *Style*, in like manner as the *East Meridian*, and hath the same *Altitude*.

CHAP. IX.

To describe the Arches of the Signs in this sort of Dyal.

FIrst, From the point in which the *Style* is erected, draw a right *Line* to cut all the *Lines* of the *Hours* to right *Angles*, and this will be the *Æquinoctial Line*, wherein all the middle *Hours* must be mark't, as hath been mentioned in the discourse of the *Horizontal Dyal*.

Secondly, From the point in which the *Line* of the *Hour* III, from the *Æquinoctial* is cut, extend the *Compaß* at pleasure to describe an *Arch*, in which the *Solar Declinations* may be designed in the same manner, as in the *Horizontal Dyal*.

Thirdly, The *Rule* is to be applyed as well to the points of those *Declinations*, as to the point in which the *Line* of *Hour* III, is cut by the *Æquinoctial*, and at the same time the points are to be observed in which the *Line* of the *Style* is cut, as well beneath as above the *Style* it self.

Fourthly, By applying the *Rule*, or *Thread* to those points, as also to each point of the middle *Hours*, designed in the *Æquinoctial*, it may be observed in what part the *Hour Lines* will be reacht, so as that through those points the *Arches* of the *Signs* may be drawn.

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CHAP. X.

To frame an Æquinoctial Dyal.

IT is so called, as imitating the *Æquinoctial Circle* divided into 24 equal parts, which are each of 15 *Degrees* for each *Hour*. Moreover, because this *Dyal* is so to be ordered, that it may keep the same *Elevation* above the *Horizon* which the *Æquator* hath for its given place.

The *Description* of this is easy, and universal for any part of the *World*, or *Elevation* of the *Pole* whatsoever, as appears by the *Scheme* in *Chap.* III, *Problem* 2.

First, Two *Lines* are to be drawn at right *Angles*, whereof the one *a*, *b*, is to be the *Meridian*, the other *c*, *d*, the *Line* of the *Hour* VI, both *Morning* and *Evening*. Secondly, From the common section of both these *Lines* make a *Circle*, at pleasure to be divided into 24 equal parts; for in this sort of *Dyal* the *Intervals* of all *Hours* are equal, and altogether alike.

Note, *That in the uppermost* Æquinoctial *the* Morning *Hours are set down towards the right Hand*; *and the* Evenings *towards the left*: *In the lowermost quite contrary, wherefore take notice that they are false done by the Gutter.*

Also that the uppermost is of use to us, only when the *Sun* is in the *Northern Signs*. The lowermost (which shews fewer *Hours* than the other) when he is in the *Southern Signs*.

Note, Secondly, That it hath a right *Style*, and that fixed Perpendicularly in the *Center*, and is instead of an *Axis*, and within the *Axis* of the *World*, yet not with any determinate *Longitude*, but rather at pleasure.

Note, Thirdly, That the *Æquinoctial* may be so framed in the *Globe*, that it may shew the *Hours* without a *Style*, only by the extremity of the *Shadow* going back by *Degrees* into the adverse part, according to the continual access of the *Suns Irradiation*. But upon this occasion the *Hours* must be set down in another order.

CHAP. XI.

To describe the Arches of the Signs in an Æqninoctial Dyal.

FIrst, Design the *Longitude* of the *Style* drawn out from the *Center* in the *Line* of the *6th Hour*. Secondly, From the extream Point of that *Longitude*, draw at pleasure, a Perpendicular to the *Line* of the *6th Hour*. Thirdly, From the same point of that *Longitude* draw also at pleasure an *Arch* at the extream part of the Perpendicular *Line* last mentioned; but this *Arch* is to be directed only towards one side, namely, that opposite to the *Meridian Line*, in which *Arch*, according to the usual manner let 3 points of *Solary Declinations* be mark't: Fourthly, The *Rule*, or *Thread* being applyed to the points of those *Declinations*, and at the same time to the extream point of the *Longitude* of the *Style*, observe what points are likewise mark't in the *Line* of the *6th Hour*; And at length, Fifthly, From the *Center* of the *Dyal* through those 3 points of the *Line* of the 6th *Hour*, describe 3 *Circles*. These will be the *Arches* proper to those 6 *Signs* which serve to this *Æquinoctial Horizon*, whether above or beneath.

CHAP. XII.

To frame a Polar Dyal.

THis is *Parallel* to the *Axis* of the *World*, and lies as it were in it, as hath been already Treated of; Wherefore it is to be Elevated above the *Horizontal Plane*, as many *Degrees* as the *Pole* of the *World*. The lowermost hath only 4 *Hours* apparent all over *France*, namely towards the right side, the *Morning Hours* IV, and V towards the left side, the *Evening Hours* VII, and VIII; But the uppermost shews the *Hours*, from VII in the *Morning* to V in the *Evening* inclusively; but no VI, because the *Sun* at the *6th Hour* is *Parallel* to the *Dyal*, and only glances upon the side thereof, and is thus described.

First, After the usual manner, draw the *Meridian Line a*, *b*, and the *Æquinoctial c*, *d*, cutting each other cross ways at right *Angles*. Secondly, And on each side make 2 *Parallels* at the *Æquinoctial*, at what distance you please. Thirdly, Let the *Horary Points* be transferr'd upon the *Æquinoctial Line* from the *Instrument*, in the same Method as mentioned in *Chap. VIII*, for the *Oriental* and *Occidental Dyals*. Fourthly, Through those Points draw the Hour *Lines Parallel* to each other; which that it may be the more commodiously done, let the same Points be marked in those *Lines* which are *Parallel* to the *Æquinoctial*. Fifthly, The *Gnomon*, or *Style* in the *Meridian Line* is to be Perpendicularly streight, and to have a determinate *Altitude*, according to the Distance of the *Meridian Line*, from the Hour, III. In the *Scheme* this sort of *Dyal* is taken notice of in *Chap. III*, *Problem* 2.

By the same Method altogether, and the same way of Computation are described the *Arches* of the *Signs*, in *Polar* and *Meridian Dyals*; for in like manner as in the *Polar Dyals* the *Æquinoctal Line* is described by the *Basis* of the *Style*, cutting at right *Angles* the *Lines* of all the Hours; So in this *Line*, and by the same way is described the *Arch* in which the *Suns Declinations* are mark't. From the Points, the *Rule* being applyed at the same time to the Point to which the *Line* of the Hour III, is cut by the *Æquinoctial*, the several Points are mark't in the *Line* which

which is subtended to the *Style*. Lastly, In like manner as in the *Meridian Dyals*, the *Rule* being applyed to those Points, and at the same time to the middle Hours distinguisht in the *Æquinoctial Line*, the Points are shewed in the *Horary Lines*, through which the several *Arches* of the *Signs* are to be drawn.

Hitherto of *Regular Dyals*; which however not to be drawn according to a right, or *Vertical Sphere*: for in the right *Sphere*, those which are *Horizontal* differ not from our *Polar Dyals* of the *oblique Sphere*. Also in the *right Sphere* those which are *Vertical* differ not from our *Æquinoctials*; but the *Meridian Dyals* in that *Sphere* are like to ours, except that in those the *Æquinoctial Line* is Perpendicular to the *Horizon*, But those which are with us *Polar*, are to them *Horizontal*. And those in the *Vertical Sphere* have the *Æquinoctial* for the *Horizontal*.

CHAP. XIII.

Of Irregular *and* Declinant Dyals.

THe nature and kinds of these *Dyals*, have been already declared in the beinning of this Treatise. There wants only the practice of finding the *Declination*, and also of framing a *Declinant Dayl*.

1. The *Declination* of the place may be easily found by the help of the *Mariners Compass* treated of in the *Art* of *Navigation*. But in this particular the most Accurate way, is to apply the *Semicircle* divided in the *Plane* to a fitting Number of *Degrees*, the *Gnomon* being placed at its *Center*. For in that *Meridian Hour* you will see what *Degrees* the *Shadow Cuts*, and which way it is cast, the better to determin of the *Species*, and quantity of its *Declinations*. These things thus premised, you may without any other *Art* draw a *Dyal* in any place, fixing therein at right *Angles* any right *Style* of whatsoever *Magnitude*.

2. Wherever the *Meridian Hour* is mark't, the extremity of the *Shadow* projected by it with a *Prick*, then at that *Prick*, by the benefit of a *Plum-Line*, if it be in a *Vertical Plane* draw a *Perpendicular*, This will be the *Meridian Line*. Then Thirdly, At any convenient time either before, or *Afternoon*, having by inquiry learnt out the certain *Hour* of the *Day*, from any true made *Dyal*, mark with a *Prick*, the extremity of the *Shadow* then projected; and this do till you have prick't out all the *Hours* that may be set down in the given *Plane*.

Then intermitting for some *Days*, or *Weeks*, as shall be thought fitting, take a review of some of those *Hours*, and you will find the extremity of the *Shadow* some space distant from the *Prick* of the same *Hour*, mark't some *Days*, or *Weeks* before. Through those two *Pricks* draw a right *Line* without any certain Bound; this will *Cut* the *Meridian Line* drawn at the beginning; and the *Section* so made is to be the *Center* of the *Dyal*, from whence the other *Hour-Lines* are to be drawn through other *Pricks* for the finishing of the *Dyal*.

By the same Method, once in a *Year*, or half a *Year*, as the *Sun* is just entring into a new *Sign*, observe each *Hour* the extream point of the *Shadow* cast by the *Style*, so as by those points to draw the *Arches* of the *Signs*.

CHAP. XIV.

The common way to Draw a Declinant Dyal.

FOr this we use the *Æquinoctial Quadrant*, already mentioned in the last *Scheme* of the *Fourth Chapter*. But the first thing in this Operation to be taken notice of, is whether the Declination be from the *North*, or *South*; or to the *East*, or *West*. Next, How great, that is, how many *Degrees* the *Declination* is. For Example, In our *Scheme*, or *Figure*, the *Declination* is from *South* to *East*; which way of *Declination* requires this following *Praxis*.

1. Describe the *Horizontal Line a*, *b*.

2. Draw the obscure *Perpendicular c*, *d*.

3. Fix at right *Angles* the *Style*, in the Intersection of those two *Lines*, at the Point *e*.

4. Mark the *Longitude* of the *Style*, in the *Line c*, *d*, at the Point *f*.

5. Dispose the *Instrument* to the *Line c*, *d*, its *Center* being applyed to the Point *f*, but to be turn'd to the Declining part, that is, to the *East*; if the *Declination* be *Eastwards*; but on the contrary *Westward*, if the *Declination* be *Westward*.

6. Number the *Degrees* of *Declination* from the Point *g*, For Example, to the Point *b*. Then from the *Center* of the *Instrument* in which the extremity of the *Style* is designed, draw a *Line* from the Point *b*, to the *Horizontal Line* in *j*.

7. Through the Point *j*, draw the Perpendicular *l*, *m*, which is to be the *Meridian Line*.

8. To find out the *Center* of the *Dyal*, the *Longitude* of the *Line f*, *j*, is to be mark'd in the *Horizontal Line* from the Point *j*, towards either part; For Example, Towards the part *n*, at the Prick *n*, in which Point the *Center* of the *Instrument* is placed, the side thereof lying upon the *Horizontal Line*. Then from the *Horizontal Line* beginning at the Point *o*, number the *Degrees* of the *Poles Elevation*; which, for Example may cut the *Degree p*, then without limit draw the occult *Line n*, *p*, *l*, which in the Section of the *Meridian Line* is to mark the Point *l*, for the *Center* of the *Hours*.

9. From the *Center* of the *Hours l*, draw the occult *Line l*, *q*, through the place of the *Style e*.

10. Upon this *Line l*, *q*, at the Intersection in the

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the Point *e*, raise the perpendicular *r*, *e*, according to the length of the *Style*.

11. From the *Center l*, to the point *r*, draw the occult *Line l*, *r*.

12. In the point *r*, of the *Line l*, *r*, raise a perpendicular to cut *l*, *q*, in the point *f*.

13. In the Point *f*, erect a *Perpendicular*; or draw at *right Angles* through the point *f*, the *right Line r*, *u*, and this is to be the *Æquinoctial Line* in which the *Horary* points are to be mark't.

14. Measure the *Longitude* of the *Line r*, *s*, from the point *s*, to the point *x*, in the *Line l*, *q*; then from the point *x*, draw a *right Line* at the Intersection of the *Meridian* and *Æquinoctial Lines* in the point *y*.

15. In the point *x*, place the *Center* of the *Instrument*, the side thereof lying upon the *Longitude* of the side *x*, *y*.

16. From the *Center* of the *Instrument* draw occult *Lines*, through 15 *Degrees*, which cutting the *Æquinoctial Line*, will mark therein the points of the *Hours* XII, XI, X, IX, VIII, VII, VI.

17. If the *Plane* be such as to be capable of containing more *Hours*, whether *Morning* or *Evening*, regard being had of the *Declination*, the site of the *Instrument* will be to be changed. Wherefore to gain the *Hours* before VI, change the *Instrument*, so that the *Center* may be disposed to the said point *x*, and the *Style* to the occult *Line* which marks the point of the 6*th Hour*. Then through 15 *Degrees*, mark in the *Æquinoctial Line*, what other *Horary Points* you please. For Example, the points of the *Hours* V, and VI.

18. To gain the other *Afternoon-Hours*, the Position which the *Instrument* hath in the *Figure*, or *Scheme*, is so to be inverted, that it be beneath the *Line x*, *y*, the same side being applyed along that *Line x*, *y*. In a word, the *Instrument* is only so to be turned about the *Line x*, *y*, as to be beneath it, which done, first draw an occult *Line*, cutting the *Æquinoctial* from the first *Hour*, and so in the like manner for the rest, still observing the space of 15 *Degrees*.

19. And at last all the occult *Lines* being expunged, the *Hour-Lines* are to be drawn from the *Center* of the *Dyal* through the assigned *Horary Points*.

CHAP. XV.

To find out the Hours of the Night, by the Rays of the Moon.

1. 'Tis to be supposed an *Horizontal Sun-Dyal* at hand, is either fixt or moveable; such as is usually carried about.

2. We suppose, joyn to the other a *Moon-Dyal* as they call it, framed of two *Concentrick Circles*, in the one of which are set down the *Days* of the the *Moons* age, by a *Globule* applyed to the number 30. In the other the 12 *Hours* here and there set down.

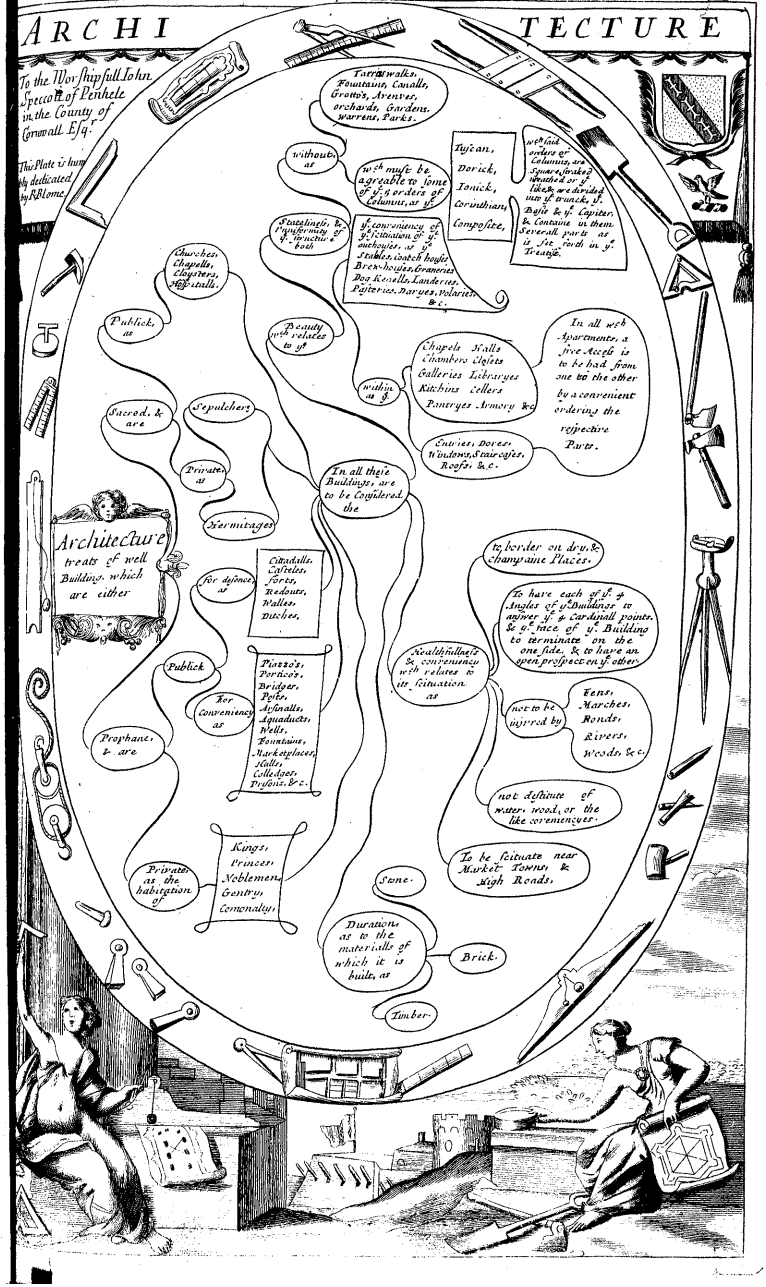
3. Suppose the age of the *Moon* known, either by the *Epact*, or some other way. These things thus laid down, proceed as followeth by the benefit of a *Sun-Dyal* applyed to the *Lunar Beams* in the same manner as used to be applied to those of the *Sun*. See what *Hour* the *Moons Shadow* points; As for Example, the 8*th*. Then place the *Globule* to that *Hour* set down in the *Horary Circle*. And Lastly have recourse to the age of the *Moon*, and that will give the *Hour* sought. For Example, If it be the 12*th* *Day* of the *Moons* age, it will declare the *Hour* to be about 5½. But if, as it often happens, a *Lunar-Dyal* be produc't, made up of 3 *Concentrick Circles*, whereof the last and biggest is that of the *Lunary Days*; the second and next to it is the *Horary Circle*; the innermost contains the *Index*. Apply that *Index* to the Day of the *Moon*; Then in the *Circle* of the *Index* seek the number of the *Hour* mark'd by the *Lunary Shadow* in the *Sun-Dyal u*, *g*, 8, the said Number will declare in the *Horary Circle* the *Hour* sought.

CHAP. XVI.

Upon a Lunar Dyal, *to find the Periodick Motions of the* Sea.

IF you would know at what *Hour* it will be high *Tide*, or as they call it, *Full Sea* in any given place, For Example sake, at *Rochel*.

First, It must be known at what *Hour* it happens in that place at the time of full *Moon*, and this may easily be known both by observation and enquiry. This done, place the *Globule* fixt to the moveable *Wheel* of the *Lunary Days* at that *Hour* in which these *Tides* happen in that place at the full of the *Moon*. For Example, at the *Hour* X. Then seek the age of the *Moon* for the given day; As suppose the 9*th* of the *Moon*. Lastly, observe to what *Hour* the said number 9, being the age of the *Moon*, is opposite, and that is the *Hour* sought.


ARCHI TECTURE
To the Worshipfull John Speccott of Penheale in the County of Cornwall Esq.
This Plate is humbly dedicated by R. Blome.
Terrae walks, Fountains, Canalls, Groves, Avenues, orchards, Gardens, warrens, Parks.
without as
Tuscan, Dorick, Jonick, Corinthian, Compositе,
Churches, Chapells, Cloysters, Hospitalls.
Publick, as
Sacred, & are
Sepulchers
Private, as
Hermitages
Chapels Halls Chambers Closets Galleries Libraryes Kitchins Cellers Pantryes Armory &c
within as
Entries, Doores, Windows, Staircases, Roofs &c.
In all their Buildings are to be Considered the
Architecture treats of well Building, which are either
for defence as
Citadalls, Castles, Forts, Redouts, Walles, Ditches,
Publick
For convenency as
Piazza's, Portico's, Bridges, Ports, Arsinalls, Aquaducts, Wells, Fountains, Marketplaces, Halls, Colledges, Prisons, &c.
Prophane, & are
Kings, Princes, Noblemen, Gentry, Comonalty.
Private, as the habitation of
Stone.
Durations as to the materialls of which it is built, as
Brick.
Timber.
to border on dry, & champaine Places.
To have each of ye 4 Angles of ye Buildings to answer ye 4 Cardinall pointes, & ye face of ye Building to terminate on the one side, & to have an open prospect on ye other.
Healthfullness & convenience with relation to ye Situation as
not to be injured by
Fens, Marches, Ponds, Rivers, Woods, &c.
not destitute of water, wood, or the like convenience.
To be situate near Market Towns & high Roads.

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ARCHITECTURE.

ARCHITECTURE is the *Art* of well *Building*.

Buildings are either *Sacred*, or *Prophane*.

Sacred Buildings are either Publick, or Private; the Publick are *Churches*, *Chappels*, *Cloisters*, *Hospitals* and the like. The Private are *Hermitages*, *Sepulchers*, &c.

Prophane Buildings are also Publick or Private; the Publick are either for *Defence*, or *Conveniences*; Those for *Defence* are *Citadels*, *Forts*, *Redoubts*, *Walls*, *Ditches* and the like, which more properly belongs to *Fortification*, and will be there treated of; Those for *Convenience* are *Piazzas*, *Portico's*, *Streets*, *Walks*, *Bridges*, *Posts*, *Sluces*, *Aquæducts*, *Wells*, *Fountains*, *Cisterns*, *Market-places*, *Courts* of *Judicature*, *Halls* of *Publick Societies*, *Colleges*, *Arsinals*, *Magazins*, *Prisons*, *Ports*, &c.

Private or particular *Buildings* are the *Habitations*, as well of the *Nobles* and *Gentry*, as of the *Peasant*.

In all *Buildings*, *Beauty*, *Convenience*, *Healthfulness* and *Duration* is to be considered.

The *Healthfulness* of a place, is chiefly known by the Goodness of the *Water*, the wholsome Constitution and long living of the Inhabitans, and its Remoteness from *Fens*, and *Boggy places*.

A *Habitation* should not look towards the *East*, if it be near great *Marshes*, *Ponds*, *Rivers*, *Woods*, &c. by reason of the *Mists* and *Vapours* drawn up by the *Morning Sun*; but if it borders upon dry places, as *Hills*, *Pasture-Grounds*, or the like *Champain Places*, an *Easterly Situation* may be well enough. A *Southern Prospect* in many places is dangerous, but most tolerable in *Winter*; But the *North* is always good, as yielding a Fraisheur and Cooiness against the Heats of *Summer*: Such a *Situation* is proper for *Granaries*, *Caves*, *Grotto's*, *Libraries*; and such like places. A *South West View* is proper for *Chambers*; however to render the *Building* indifferent good, it ought to Front the *North-West*; but the most compleat of all *Situations* is when each of the 4 *Angles* of the *Building* answer to each of the 4 *Cardinals Points*, and when the *Face* of the *Building* is terminated on the one side, and hath an open Prospect on the other.

For the *Building* of *Countrey Houses*, a place is to be chosen near *Towns*, *Woods*, *Waters*, and *High Roads*.

The *Apartments* of the *Building* ought to be disengag'd, and of a free Access. They are these following, the *Anti-Hall*, and *Hall*, *Parlours*, *Chappels*, *Dining-Rooms*, *Withdrawing-Rooms*, *Bedchambers*, with *Alcou*, or without, *Dressing-Rooms*, *Closets*, *Closestool-Rooms*, places for *Wood* and others Conveniences, *Anti-Chambers*, *Chambers*, *Wardrobes*, *Nurseries*, *Galleries*, *Libraries*, *Armories*, *Kitchins*, *Scullery*, *Bake-House*, *Pastery*, *Larders* wet and dry, *Cellers*, *Panteries* or *Butteries*, *Wash-Houses*, *Landeries*, *Brew-Houses*, *Daries*, *Granaries*, *Stables*, *Coach-Houses*, *Dog-Kennels*, *Volaries*, *Cow-Houses*, *Hogs-Coats*, *Hen-Houses*, *Wood-Houses*, *Dove-Houses*, &c. Also *Tarrass Walks*, *Wells*, *Fountains*, *Canals*, *Grotto's*, *Arbours*, *Avenues*, *Yards*, places for managing the Great *Horse*, *Fish-Ponds*, *Parks*, *Warrens*, *Orchards*, *Gardens*, &c.

The principal parts of the *Building* are the great *Outward-Wall*, the several *Partition Walls*, the *Entry*, the *Jambs*, *Doors* and *Windows*, the Passages or *Avenues* from *Room* to *Room*, the *Roofs* as well *Vaulted*, or *Arched*, as otherwise; the *Floors*, *Stair-cases*, and the *Covering* of the *House*.

The weight of the *Building* ought to be placed upon the Parts capable to sustain them; so the *Beams*, or *Summers* which sustain the Planks, ought never to be put upon an empty space, as over *Windows*, and *Doors*.

Void always ought to be upon Void, and Solid upon Solid.

The *Beams* should never be placed upon the *Chimneys*, by reason of Fire; nor no other Timber whatsoever.

The length of the *Beams*, and of the *Joists* ought to be proportionable to their thickness, and the distance of the *Beams* not to exceed 10, 11, or 12 *Foot*.

The *Beams* ought to bear into the *Wall* about 12 *Inches*, where the thickness of the *Wall* will bear it, and admit no more.

The *Joists* ought to take up the full, as well as the empty spaces.

The *Apartments* of the same *Story* are to be placed in an even plain.

The parts which are remote from the middle, ought all to have an equal distance.

The upper *Stories* ought always to be less in heighth than the lower.

The Columns.

There are 5 Orders of *Columns*; according to the Antients, *viz.* the *Tuscan*; *Dorick*; *Ionick*, *Corinthian*, and *Compositе*.

From these Orders of *Columns* all sorts of *Buildings* take their Names; so that if the *Architect* changes his Measures in any of these Ornaments, it is called The new *Fabrick*.

The squated *Columns* that are implanted in the *Wall* are called *Pilasters*.

There are a sort of *Columns* called *French*, which are composed of several pieces put together,

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and this Invention arose from the difficulty of finding Materials of one piece big enough for the purpose.

There are also wreathed *Columns*, otherwise called *Salomonick*.

Sometimes *Columns* are Canell'd, or Fluted, and these *Flutes* for the most part reach but to two Thirds of the *Column*; the other part below being set out with *Flowers*, *Vine-Branches*, and other sorts of *Foliage*.

Columns are divided into the *Trunk*, *Basis*, and *Capiter*, the Ornaments whereof are different according to the diversity of the *Orders*.

The *Pedestal*, upon which the *Column* commonly stands, is divided into the upper *Cimatium*, the *Cimatium* below, and the space between, which is indeed most properly called the *Pedestal*.

On the Top of the *Column* is the *Capital*, upon which is the *Entablature*, which is divided into *Architrave*, *Friese*, and *Cornice*.

The *Semidiameter* of the *Column* below is called the *Model*, and gives measure to all the parts, and Ornaments.

The *Model* is divided into 12 equal parts in the *Tuscan*, and *Dorick* Orders, and into 18 in the other three Orders.

The *Pedestal* is always a third part of the *Column*, and the *Capital* a fourth.

The *Wreaths* on the Top ought ever to be placed upon the Solid part of the *Column*, and not in the *Out-settings*.

The TUSCAN ORDER.

THis Order according to *Vitruvius* (*Lib.* 4. *Cap.* 7.) having its heighth sevenfold to its thickness, it follows that its height must be 14 *Models*, the *Base* 1, the *Capital* 1, and the *Trunk*, or *Body* 14.

The Ornaments of the Base, *are*

	Parts.	Projecting.
The *Plinth* should be in Solid Bigness	6	4 ½
The *Torus*	5	4 ½
The *Cincture* of the *Basis*	1	1 ½

The Ornaments of the Capital, *are*

The List of the *Abacus*	1	5
The *Abacus*	3	4
The *Ovum*, or *Ovolo*, or Quarter round	3	3 ½
The List under the *Ovum*	1	1
The *Friese* of the *Capital*	4	0

Beneath the *Capital* is the *Roundel*, or *Astragal*, and the *Collar*, which makes part of the *Trunk* of the *Column*, not of the *Capital*.

The *Astragal*, or *Roundel*	1	2
The *Collar* of the *Column*	½	1

The *Trunk* of the *Column* is of the height of one *Model*, and 7 parts over, in like manner as the *Friese* of the *Capital*, which for that reason hath nothing of projecture.

Although the *Tuscan Order* seldom hath a *Pedestal*, yet it is made here for *Example* sake, as in the *Figure* marked *B*. And in all the 5 Orders take this for a general *Rule*, That the *Pedestal* with its Ornaments must be one third part of the *Column*, with its *Basis* and *Capital*; likewise the Ornaments above, *viz.* the *Architrave*, *Friese*, and *Cornice* must make one fourth part of the same. And if you are to make any of the 5 Orders, you must divide the height of the *Column* with its Ornaments into 19 parts; then take the height of the *Column* with its *Basis*, and *Capital*, and make the divisions of the *Models* according to its Order, as the *Dorick*, *Ionick*, &c. Then frame the *Fabrick* with this *Model*, dividing its parts, as may be seen in the said *Figure* marked *B*, where *A*, doth represent the Body of the *Column*; *B*, the nether *Band* or *Swathe*; *E*, the *List*; *F*, the *Gula*, or Throat reversed in the *Pedestal*; *G*, the *Body* of the *Column*, and so forth.

The *Figure A*, shews the *Capital*, *Architrave*, *Friese*, and *Cornish* of the said *Tuscan* Order; And the *Figure B*, tho *Base*, and *Pedestal* thereof.

The Names of the several Parts, or Members of the Column, according to the Figure *marked* A.

THat marked *A*, is called the *Ovum*, or *Ovolo*. *B*, the *Tondino*, or round. *C*, the *List* or Rule. *D*, the *Crown*. *E*, the *List*. *F*, the *Gula* or Throat reverst. *G*, the *Friese*. *H*, the *List* of the *Architrave*. *I*, the *Architrave*. *K*, the *List* of the *Abacus*. *L*, the *Abacus*, or *Cimatium*. *M*, the *Ovum*, or *Ovolo*. *N*, the *List*. *O*, the *Friese* of the *Capital*. *P*, the Neck of the *Column*. *Q*, the hanging over the *Capital*. And *R*, the *Body* of the *Column*.

The *Cornish* which consists of a *Model*, and 4 of its parts, hath these parts following, with their Projectures.

	Parts.	Projecting.
The *Ovum*, or 4th part of the *Round*	4	18
The *Round*	1	14
The *List*, or *Reiglet*	½	13 ½
The *Corona*, or *Gutter*	6	13
The *List* beneath	½	4 ½
The *Doucine*, or *Cimatium* reverst	4	4
The *Friese* is not subdivided, it is of	14	4
The *Architrave* is divided into the *List*, and *Architrave*.		
The *List* of the *Architrave*	2	2
The *Architrave*	10	0

The *Architrave*, and the *Friese* are to bear upon the *Friese* of the *Capital*.

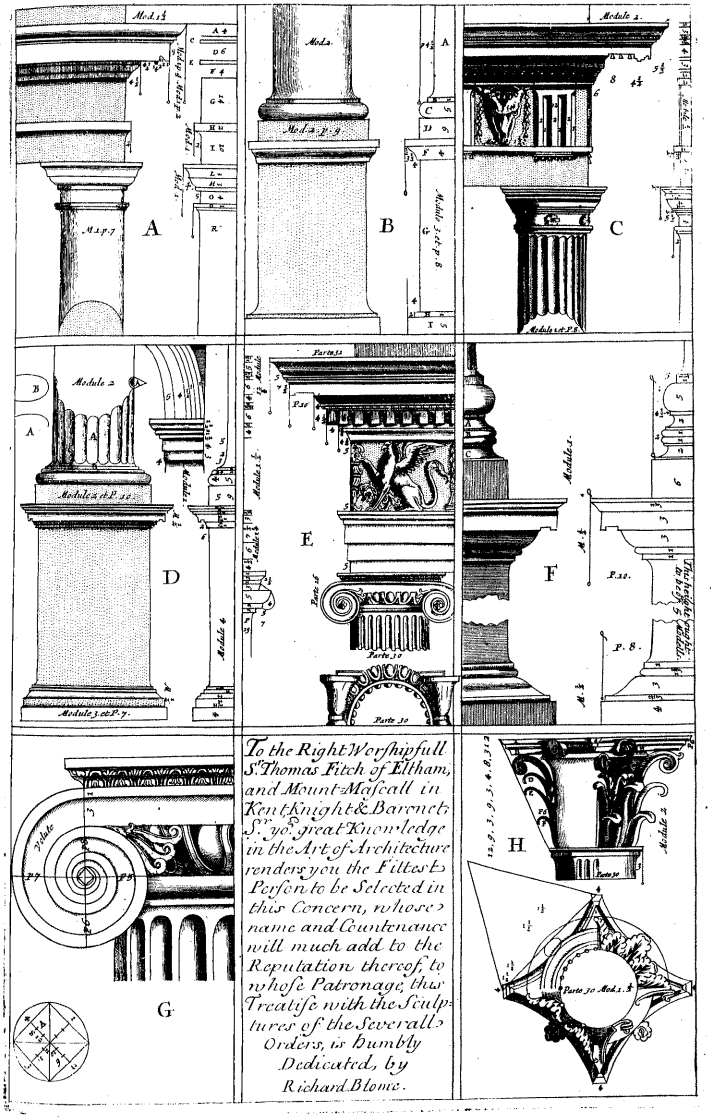
If over and above the *Entablement*, the *Column* be allowed a *Pedestal*, it must be divided into 19 Parts, whereof the *Column* is to have 12, the *Entablement* 3, and the *Pedestal* 4, so that the whole heighth is to be 22 *Models* and ½.

The Ornaments of the *Pedestal* are the upper *Cimatium*, and the lower *Cimatium*, and both are to be of 6 parts.

The upper *Cimatium* hath 2 parts.

The *List*	2	4
The reverst *Cimatium*, or *Doucine*	4	3 ½
The begining of the shall have of Projecture	0	½
The lower *Cimatium*	2	0

The


A
B
C
D
E
F
G
H
To the Right Worshipfull Sr. Thomas Fitch of Eltham, and Mount-Mascall in Kent Knight & Baronet; Sr. yo. great Knowledge in the Art of Architecture renders you the Fittest Person to be Selected in this Concern, whose name and Countenance will much add to the Reputation thereof, to whose Patronage, this Treatise with the Sculptures of the Severall Orders, is Humbly Dedicated, by Richard Blome.

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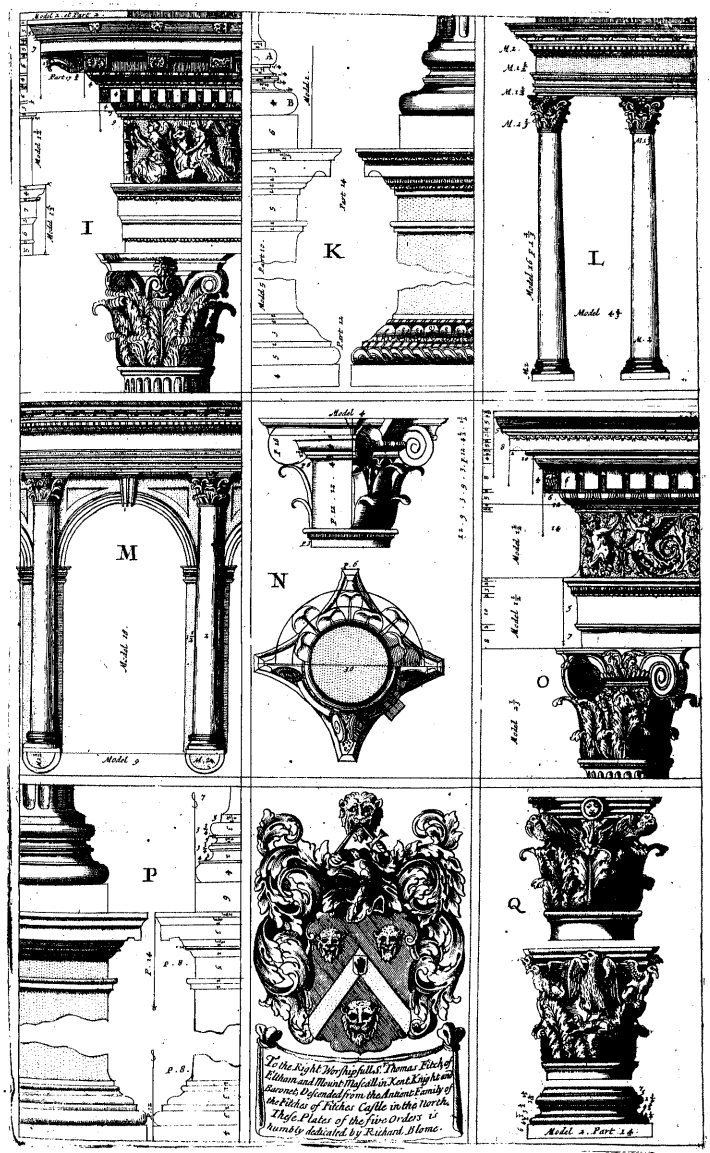
I
K
L
M
N
O
P
Q
To the Right Worshipfull Sr Thomas Fitch of Eltham and Mount Mascall in Kent Knight and Baronet, Descended from the Antient Family of the Fitches of Fitches Castle in the North. These Plates of the five Orders is humbly dedicated by Richard Blome.

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The *Liſt*, or *Reiglet* —— 1 —— 2
The *Plinth* of the *Pedeſtal* —— 5 —— 4

Obſerve that for the finding the *Model* of the Column the heighth being given, whatever diviſion be otherwiſe made, the heighth of the *Column* muſt be divided only into 14 equal parts, one whereof is to be the *Model* required.

The *Intercolumnium* from *Trunk* to *Trunk*, is to be of 4 *Models* and $\frac{1}{4}$; but if there be *Portico's* without a *Pedeſtal*, then the *Pilaſter* is to be of 3 *Models*, the *Impoſt* of 1, and the *Projecture* of 1 fourth of a *Model*; The diſtance of the *Arch* to the *Architrave* of 1 *Model*; The Foot of the *Arch* of $\frac{3}{4}$ *Models*. The *Door* muſt be 13 *Models* high, and 6 $\frac{1}{2}$ wide, and the diſtance from the *Impoſt* to the *Architrave* muſt be 4 $\frac{1}{4}$ *Models*; but if there be *Portico's* with the *Pedeſtals*, then the *Pilaſters* are to be of 4 *Models*, the heighth of the *Door* of 17 *Models*, and the wideneſs of 8 $\frac{1}{4}$ *Models*.

Of the DORICK ORDER.

THe *Dorick Column* is Octuple, or Eight-fold in its thickneſs, ſo that its heighth muſt be of 16 *Models*.

The Figure marked *C*, repreſents the *Dorick Order* whoſe parts are thus marked: *A*, The *Grove* or hollowing of the upper *Liſt*. *B*, the *Dentils* or Teeth. *C*, The *Capital* of the *Triglyph*. *D*, the *Trizlyph* in which thoſe parts that are framed inwards are called *Flutes*; or *Hollows*, and the Square place of the *Frieſe* between the *Triglyphs* is called a *Metops*. *E*, the Props, or little *Bills*. *F*, the *Cimatium*. And *G*, the *Annulets*, *Bands* or *Liſts*. This Figure repreſents the *Baſe* and *Pedeſtal* of the ſaid Order.

They give one *Model* to the *Baſe*, and one to the *Capitals*, and by conſequence the Shaft of the *Column* is to be 14 *Models*, The *Column* muſt be of 1 $\frac{1}{3}$ *Model* in heighth. The parts of the *Baſe* are as followeth.

	Parts.	Projecting.
The *Plinth*	6	5
The *Torus*	4	5
The *Roundel*, or *Baſton*	1	2 $\frac{1}{2}$
The *Cincture* of the *Baſe*	1	2

The Parts of the Capital.

One *Cimatium*, one *Liſt*	$\frac{1}{2}$	5 $\frac{1}{2}$
which hath one *Doucine*	1	5
The *Abacus*	2 $\frac{1}{2}$	4
The *Ovum*	2 $\frac{1}{2}$	3 $\frac{1}{2}$
Three *Rings*, *Cinctures*, or *Aſtragals*, each	$\frac{1}{2}$	1 $\frac{1}{2}$ 1 $\frac{1}{2}$
The *Friſe* of the *Capital*	4	0

In the place of Rings, are

One *Baſton*	1	2
One *Liſt*	$\frac{1}{2}$	$\frac{1}{2}$

The *Aſtragal*, and the *Collar*, are of the ſame *Meaſure*, as in the *Tuſcan Order*.

The *Entablement* is to be of 4 *Models*; for the *Corniſh* 1 $\frac{1}{2}$, for the *Friſe* 1 $\frac{1}{2}$, and for the *Architrave* 1.

The Parts of the Corniſh, are

The *Liſt*	1	24
The half *Doucine*, or ſtreight *Geul*,	3	23 $\frac{1}{2}$
One ſmall *Liſt*	$\frac{1}{2}$	20 $\frac{1}{2}$
The *Doucine*, or *Cimatium* Reverſt,	1 $\frac{1}{2}$	20
The *Corona*	4	18 $\frac{1}{2}$
The ſmall *Liſt*	$\frac{1}{2}$	6
The *Dentelets*	3	2
A ſmall *Liſt*	$\frac{1}{2}$	$\frac{1}{2}$
The *Doucine*, or *Cimatium* Reverſt,	2	2
A *Liſt*	2	1
The *Friſe* is of 1 $\frac{1}{4}$ *Model*	18	0

The *Frieſe* is adorn'd with *Triglyphs*, and *Metopes*: The *Triglyphs* are 1 *Model* in bigneſs, and the *Metophes* 1 $\frac{1}{2}$. The *Triglyphs* have 2 *Triangular Canals* in the middle, and half a *Canal* upon each *Angle*; every one of the *Canals* hath 2 parts of *Front*, and the *Entredeux* of the *Canals* is alſo of 2 parts; the laſt Liſt of the *Corniſh* ſerves then for *Capitals*, and there wants 2 parts or thereabouts of their attaining this ſame *Liſt*. For the *Metophes* they are Square, and are the Space betwixt the *Triglyphs*, whoſe *Ornaments* are commonly conſiſting of two *Sheeps-Heads*, with *Cornucopia's*, or *Bucquets* of *Flowers* hanging upon the *Horns*, and a *Garland* or ſeveral Rings one within another, alſo *Coats* of *Arms*, *Eſcocheons*, &c.

The Parts of the Architrave, are,

One *Liſt*,	2	2
The *Architrave* (properly ſo called)	10	0

In the *Architrave* there are under-*Triglyphs* after the *Liſt* of *Gutters* or *Clochets*, which depend upon another *Liſt*; but if beſides the *Entablement* you would alſo have a *Pedeſtal* added to the *Dorick Column*, it muſt be divided into 25 $\frac{1}{2}$ parts, whereof 16 will be for the *Column*, 4 for the *Entablement*, and 5 $\frac{1}{2}$ for the *Pedeſtal*; and the whole heighth is to be 2 $\frac{1}{2}$ *Models*,

The upper Cimatium of the Pedeſtal, hath theſe Parts following,

The *Liſt*	1 $\frac{1}{2}$	6
The *Ovum*	1	5 $\frac{1}{2}$
Another *Liſt*	$\frac{1}{2}$	4 $\frac{1}{2}$
The *Corona*	2 $\frac{1}{2}$	4
The *Doucine*	1 $\frac{1}{2}$	1 $\frac{1}{2}$
The *Pedeſtal* (properly ſo called) hath 4 *Models*	48	0

The Parts of the lower Cimatium of the Pedeſtal, are

The *Cincture*	$\frac{1}{2}$	1
The *Baſton*	1	1 $\frac{1}{2}$
The *Doucine*	2	3 $\frac{1}{2}$
The *Plinth*	2 $\frac{1}{2}$	4
Another *Plinth*	4	4 $\frac{1}{2}$

The *Intercolumnium* from *Trunk* to *Trunk*, is to be of 5 $\frac{1}{2}$ *Models*; but if there are *Portico's*, and the *Columns* be without their *Pedeſtals*, the *Pilaſter*

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Pilaster is to be of 3 *Models*, and the *Impost* of one.

The Parts are to be these following.

The *List*	1 — 4
The *Ovum*	2½ — 3½
The *Baston*	1 — 2
Another *List*	½ — 1½
A *Fash Fascia*	4 — 1
Another *Fascia*	3 — ½

The *Arch* is to be compoſed of *Baſtons* or *Tayaux* of the ſame bigneſs and projecture as the Parts of the *Impoſt*; the *Door* is to be 14 *Models* high, and 7 wide below the *Arch*. There are to be two *Liſts* to anſwer the *Aſtragal*, and the *Collar* of the *Column*, and are to be of the ſame wideneſs and projecture; But if there are *Portico's*, and the *Columns* have their *Pedeſtals*, the *Pilaſter* is to be of 5 *Models*, the *Impoſt*, and the *Arch* with their parts according as is already ſet down, and the *Door* is to be 20 *Models* high, and 10 wide.

Of the IONICK ORDER.

THis Order as it is Nine-fold in thickneſs, ſo its heighth is to be of 18 *Models*: 1 *Model* is given to the *Baſe*, and ½ of a *Model* to the *Capital*, and ſo the Shaft of the *Column* will be of 16 *Models* and ½, the *Column* it ſelf is to be of 1 *Model*, and ½ in heighth.

Obſerve, that in the *Tuſcan* and *Dorick Orders*, the *Model* is divided only into 12 equal parts; whereas in the *Ionick*, *Corinthian*, and *Compoſite Orders*, it is divided into 18 equal parts, becauſe the ornaments of the three laſt are ſmaller, and more curious than thoſe of the two firſt.

The Figure marked *D*, repreſents the *Ionick Order*, whoſe parts are thus marked. *A*, the *Scotia*, or upper hollowing. *B*, the *Aſtragaloes*, or Rounds. *C*, the *Scotia*, or nethermoſt hollowing. Alſo the *Figures* marked *E*, *F*, and *G*, are parts of the *Ionick Order*, the later of which is the *Voluta*, or *Scroll*.

The Figure *D*, ſhews the *Baſe* and *Pedeſtal* of the ſaid Order. *E*, the *Capital*, *Architrave*, *Frieſe*, and *Cornish*. *F*, the *Baſe* and *Pedeſtal*; and *G*, the manner of deſigning the *Voluta* of the *Capital*.

The Ornaments of the Baſe, are theſe

The *Plinth*	6 — 1 — 7
A *Liſt*	½ — 6½ — 6½
The *Scotia*, *Gutter*, or *Cavity*	2 — 4 — 4
A *Liſt*	½ — 4½ — 4½
A *Baſton*, or *Torus*	1 — 5 — 5
Another *Baſton*	1 — 5 — 5
A *Liſt*	½ — 4½ — 4½
Another *Scotia*	2 — 2½ — 2½
A *Liſt*	½ — 3½ — 3½
A great *Baſton*, or *Torus*	5 — 5 — 5

Above there is a *Face* which belongs to the Shaft of the *Column*, and not to the *Baſe*, 1½ — 2 — 2

The *Baſe* I have already deſcribed, is peculiar to that Order; but the following *Baſe* is common to theſe three Orders, *viz.* the *Ionick*, *Corinthian*, and *Compoſite*; and this *Baſe* is commonly called the *Attick Baſe*.

The Ornaments of the Attick Baſe, are theſe,

The *Plinth*	6 — 7
A *Baſton*, or *Torus*	4½ — 7
A *Liſt*	½ — 4½
A *Scotia*	3 — 1
A *Liſt*	½ — 2½
Another *Baſton*, or *Torus*	3½ — 4½

And above there is a *Face* named alſo the *Cincture* of the *Baſe*, which belongs to the *Shaft* of the *Column*, not to the *Baſe*, 1½ — 2

The Ornament of the Capital, are

A *Liſt*	1 — 5
A *Doucine*	2 — 4½
Another *Liſt*	1 — 2½
An *Abacus*	3 — 1½
A 4*th* part of a *Round*, or *Ovum*	5 — 7

And beneath there is a *Baſton*, or *Torus*, and a *Liſt* which belongs to the *Shaft* of the *Pillar*, and not to the *Capital*.

A *Baſton*, or *Torus*	2 — 3
A *Liſt*	1 — 1

Then to make a *Voluta*; a Line is to be drawn level from beneath the *Doucine*, and to be prolonged as far as the Line, which makes the upper Abord of the *Baſton*, the Point of Interſection of theſe 2 Lines will be the *Center* of the *Eye* of the *Voluta*; then from the *Center* trace every one of the 4 Lines of one part of the *Model*, and drawing through their extremities other *Lines*, you will make a Square cut the ſides into two equal parts; draw 2 *Lines* through the oppoſite Diviſions which will paſs from the *Center*; divide each one into 6 equal parts, and you will have the 12 Points mark't 1,2,3,4,5,6,7, 8,9,10,11,12, which will ſerve for *Centers* to 12 fourths of *Circles* that compoſe the *Voluta*, which conſequently will have 3 intire Revolutions, and will end in a Point, as it began at the lower ſide of the *Doucine*; but from the upper ſide of the *Abacus* there is to be begun another *Voluta*, which will end at the firſt, and whoſe 12 parts of the *Circle* will have the ſame *Centers* as the firſt, and the *Eye* of the *Voluta* is the *Circle* deſcribed from the Interſection of the 2 firſt *Lines*, as *Center* of the overture of one part of the *Model*.

Obſerve, That the *Abbacus* having left off Projection, then its upper *Liſt* will make the *Creux* of the *Voluta*, and the ſame *Liſt* which is comprized of the 2 *Lines* of the *Voluta* will be the part Projecting.

The *Entablement* will be of 4 *Models* and ½, that is to ſay, 1 *Model* ½ for the *Cornish*, 1 *Model* ½ for the *Frieſe*, and 1 *Model* ¼ for the *Architrave*.

The

The Parts of the Corniſh, *are*

One *Liſt*	1½	31
One Streight *Gueul*, or *Demi-Doucine*,	} 5	*per Emb.* 26
Another *Liſt*	½	26
One *Gueul* Reverſt, or *Doucine*,	} 2	25½
One *Gutter*, or *Corona*,	6	23½
One *Ovum*	4	13½
One *Baſton*, or *Torus*	1	10
One *Liſt*	½	9½
Dentelets, or *Modillons*,	6	9
One *Liſt*	1	5

1 *Doucine*, or *Gueul* Reverſt, 4 *per Haut* 4½ *per Baſe* ½.

The *Frieſe* hath 1 *Model* ½; it hath no Ornaments of *Architrave*, but of *Sculpture* only.

The Parts of the Architrave, *are*

One *Liſt*	1½	5
One *Doucine*, or *Gueul* Reverſt,	3 *per Embas*	1½
The firſt *Fascia*	7½	1
The ſecond *Fascia*	6	½
The third *Fascia*	4½	0

The *Pedeſtal* is to be of 4 *Models*, *viz.* ½ a *Model* to every *Cimatium*, and 5 *Models* to the *Entredeux*.

The Parts of the Upper Cimatium, *are*

A *Liſt*	½	10
A *Doucine*	1½ *per labas*	8½
A *Gutter*	3	8
An *Ovum*	3	5
A *Baſton*, or *Torus*	1	2

And below is a *Liſt* which belongs to the *Entredeux*, and not to the upper *Cimatium*.

A *Liſt*	1	1

The Parts of the Lower Cimatium, *are*

A *Plinth*	4	8
A *Liſt*	½	7
A *Doucine*	3	0
A *Baſton*	1½	2

And a *Liſt* above, which belongs to the *Entredeux*, and not to the lower *Cimatium*.

A *Liſt*	1	1

The *Intercolumnium* from *Trunk* to *Trunk*, will be of 4½ *Models*: But if there be any *Portico's*, the *Columns* being without *Pedeſtals*, the *Pilaſter* will be of 3 *Models*, and the *Impoſt* of 1, and it will have theſe Parts following.

A *Liſt*	1	6
A *Doucine*	1½	5½
A *Band* to the *Corona*	3	4
An *Ovum*	3	3½
A *Baſton*	1	2½
Another *Liſt*	½	1½
A *Fascia*	4	½

The *Door* is to be 17 *Models* in heighth, and 8½ wide. The *Arch* is to be compoſed of Ornaments of the ſame Wideneſs and Projecture as thoſe of the *Impoſt*. And if when there are *Portico's*, the *Columns* have alſo their *Pedeſtals*. The *Pilaſter* will be of 4 *Models*; the *Door* will be of 22 High, and 12 Wide; the *Impoſt* and the *Arch* will be as already determined, and the *Impoſt* from one high will be 1 *Model* wide, and 2 *Models* long, and will have for *Corniſh* 1 *Liſt*, and ½ *Doucine* of the *Capital*, as the *Liſt* and the *Doucine* of the *Capital*; but the *Projecture* of this *Impoſt* from one high will be ½ a *Model*, as that of the *Impoſt*.

Of the CORINTHIAN ORDER.

THe *Corinthian Column* is Tenfold in thickneſs, and therefore its height is to be of 20 *Models*, whereof one is allowed to its *Baſe*, 2 ½ to its *Capital*; and ſo the *Shaft* of the *Column* will be of 16 *Models*. The *Column* it ſelf will be of 30 Parts in heighth, that is to ſay, of 1½ *Model*.

The *Figures* marked *H*, *I*, *K*, *L*, and *M*, repreſent the *Corinthian Order*. In that marked *K*, the Letter *A* ſhews the upper *Torus*, or *Swathe*; and *B*, the Nether *Torus*, or *Swathe*. In that marked *L*, the Letters *A*, *B*, together, are called the *Abacus* of the *Capital*; but for diſtinction *A* is taken for the *Cimatium* of the *Abacus*; the *Stalks C*; *D*, the leſſer *Leaves*; *E*, the middle *Leaves*; *F*, the under *Leaves*; and *G*, the *Flowers*. The *Figure H*, ſhews the manner of deſigning the *Capital*. That of *I*, the *Capital*, *Architrave*, *Frieſe*, and *Cornish*. That of *K*, the *Baſe*, and *Pedeſtal*. That of *L*, an Example of the *Pillars*. And that of *M*, of *Pilaſters*.

The Parts of the Baſe, *are*

A *Plinth*	6 — 7
A *Torus*	4 — 7
A *Liſt*	½ — 4
A *Scotia*	1½ —
A *Liſt*	½ — 2½
A *Baſton*, or little *Round*	½ — 3
Another *Baſton*	½ — 3
A *Liſt*	½ — 2½
A *Scotia*	1½ —
A *Liſt*	½ — 1½
A *Torus*	3 — 2½

And above is the *Cincture* of the *Baſe*, which belongs to the *Shaft* of the *Column*, and not to the *Baſe*.

The *Face*, or *Cincture* of the *Baſe* 1½ — 1

The *Baſe* is deſcribed in the *Ionick Order*, which is the ſame as this; but inſtead thereof is uſed an *Attick Baſe*, which is common thereunto, with the *Ionick* and *Compoſite Orders*.

The *Capital* hath its *Cimatium* of a ſquare Form, whoſe *Diagonals* have 4 *Models*, upon the ſide of that Square is deſcribed an *Equilateral Triangle*; from the Point of which, as *Center* to the *Overture* of the Side, if you intend an *Arch*, there you determine the Compaſs of the *Cimatium*; and in the middle of that Compaſs may be put a ſmall *Projecting*, which may be made into a *Flower*. Its *Diameter* will be 6 Parts, and its

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Projecture alſo 6 Parts, which will be determined by the ſide of the Square.

The Parts of the Cimatium *of the Capital, are*

An *Ovum*	2
A *Liſt*	1
An *Abacus*	3

The Extremeties of the *Abacus* may be Retrench'd, as to conſiſt only of four Parts.

The reſt of the *Capital* hath the *Figure* of a *Bell* reverſt, whoſe Side (which is under the *Abacus*) hath 2 Parts of largeneſs, and 4 of *Projecture*. It is divided into three equal Parts, and each of them again into 12, for the *Foliages* which ſerve for ornament to the *Column*. Theſe *Foliages* conſiſt of *Acanthus*, or *Olive-Branches*, which are to hang down about 4 Parts; but their *Projecture* is to be determin'd by a *Line* drawn from the extremity of the *Cimatium* to the *Roundel*, which are under the *Capital*. Some are of Opinion, that the *Foliage* may paſs a little beyond this *Line*, and the *Angles* of the *Cimatium* are carried by *Rollers*, which others call *Tigats*; beſides two other *Rollers*, which are turned one towards the other ſo far, as to touch under the *Flower*, which is moſt commonly a *Roſe*.

Under the *Capital* is a *Roundel*, and alſo a *Liſt* which belongs to the *Shaft* of the *Pillar*.

A *Roundel*	1 — 3
A *Liſt*	1 — 1 ½

The *Entablement* is to be of 5 *Models*; that is, 2 *Models* for the *Corniſh*, 1 ½ for the *Frieſe*, and 1 ½ for the *Architrave*.

The Parts of the Corniſh, *are*

A *Liſt*	1 — 2 — 2
An Half *Doucine*, or Streight *Gueul*	5 from 33 to 38
A *Liſt*	½ — 33
A *Doucine*	1 ½ — 32 ½
A *Corona*	5 — 31
A *Doucine*	1 ½ — 30 ½
A *Plinth*, with the *Modillons*,	6 — 13
A *Liſt*	½ — 12 ½
An *Ovum*	4 — 12 ½
A *Roundel*	1 — 10
A *Liſt*	½ — 9 ½
Dentelets, or *Denticles*,	6 — 9
A *Liſt*	½ — 5
An *Ovum*	3 — 5

Below there is a *Roundel*, and alſo a *Liſt*, which are a part of the *Frieſe*, not of the *Corniſh*.

The *Frieſe* hath one *Model* and an half; its Parts are,

A *Roundel*	1 — 2
A *Liſt*	½ — ½

The reſt is the *Frieſe*, properly ſo called.

The Parts of the Architrave, *are,*

A *Liſt*	1 — 5
A *Doucine*	4 from 3 to 5
A *Roundel*	1 — 3
A *Faſcia*	7 — 2 ½
A *Doucine*	2 — 2 ½
A *Faſcia*	6 — ½
A *Roundel*	1 — ½
A *Faſcia*	5 —

The *Pedeſtal* being always the third Part of the *Column* is to be of 6 ⅔ *Models*; but ſome make it of 7 *Models*, to the end that the whole *Order* may be thereby the more firm; and becauſe the 2 *Cimatiums* being taken away, there remains 2 Squares for the *Entredeux*.

The Upper Cimatium *is to be of* 14 *Parts, and its Ornaments are,*

A *Liſt*	⅔ — 8
A *Doucine*	1 ⅓ — 7 ⅓
A *Corona*	3 — 6
An Half *Doucine*	1 — 3
A *Roundel*	1 — 2
A *Liſt*	1 — ⅔
A *Frieſe*	3 —
A *Roundel*	1 — 2

Below there is a *Liſt*, which belongs to the *Entredeux*.

A *Liſt*	1 — 1

The Lower Cimatium *is to be of* 12 *Parts; and its Parts are theſe,*

A *Plinth*	4 — 8
A *Torus*	3 — 8
A *Liſt*	1 — 6
An Half *Doucine*	3 from 2 to 6
A *Roundel*	1 — 2

And above a *Cincture*, which belongs to the *Entredeux*.

A *Cincture*	1 — 1

The *Entrèdeux* is to be of 5 *Models*, and 4 Parts, if the *Pedeſtal* be ⅗ of the *Collar*, according to the General Rule; but if it be allowed 7 *Models*, the *Entredeux* is to be of 5 *Models*, and 10 *Parts*.

The *Intercolumnium* from *Trunk* to *Trunk*, is to be of 4 ½ *Models*; but if there be *Portico's*, the *Columns* being without *Pedeſtals*, the *Pilaſter* is to be of 3 *Models*, and the *Impoſt* of 1.

Its Parts are,

A *Liſt*	1 — 6
A *Doucine*	2 from 4 to 5 ½
A *Corona*	4 — 4
An *Ovum*	2 — 3 ½
A *Roundel*	1 — 1 ½
A *Liſt*	½ — ½
A *Frieſe*	6 —
A *Roundel*	1 — 2
A *Liſt*	½ — 1

The

The *Arch* muſt be compoſed of Ornaments of the *Impoſt*, of the ſame *Accidents* and *Projecture*. The *Door* is to be 18 *Models* high, and 9 wide. And if when there are *Portico's*, the *Columns* have alſo their *Pedeſtals*, the *Pilaſter* is to be of 4 *Models*, the *Door* is to be the heighth of 24 ½ *Models*, if the *Pedeſtal* be Regular; but it is to be of 5 *Models*, if the *Pilaſter* contain 7 *Models*; and its wideneſs muſt be one half of its height. The *Impoſt* and *Arch* will be as hath been already determined; and the *Impoſt* on high is to be 1 *Model* large, and 2 *Models* long. It will have for *Corniſh* an *Ovum*, a *Liſt*, and an *Abacus*, as the *Cimatium* of the *Capital*, and its *Projecture* will be equal to that of the *Lateral-Impoſt*.

The COMPOSITE ORDER.

THis *Order*, which is alſo called the *Latin Order*, as invented by the *Romans*, is ſo named as participating of ſeveral *Orders*, the moſt Regular and Beautiful is that which is compoſed of the *Ionick* and *Corinthian*, and comprehends what there is of Elegance and Beauty in either of the two *Orders*; which alſo borrows very much of the two firſt.

The *Figures* marked *N*, *O*, *P*, *Q*, repreſent the ſeveral parts of this *Compoſite Order*, *viz. N*, the manner of deſigning the *Capital*. *O*, the *Capital*, *Architrave*, *Frieſe*, and *Corniſh*. *P*, the *Baſe* and *Pedeſtal*. And *Q*, an Example of the *Capital*, with *Birds* and *Beaſts*.

This *Order* hath as great a Fame, as the *Corinthian*. Its principal Parts are compoſed of the ſame Ornaments, and divided in the ſame manner; and indeed there is no material difference to be found, except in its *Capitals*, and *Pedeſtals*, whereof I ſhall only ſpeak of the Parts of this *Order*, which differs from thoſe of the *Corinthian*.

The *Pedeſtal* of this *Order* differs not from that of the *Corinthian*, except in ſome parts of the upper and lower *Cimatium*.

The Parts of the Upper Cimatium, *are*

One *Liſt*	⅔ — 8
One *Doucine*	1 ⅓ — 7 ⅓
A *Corona*	3 — 6
An Half *Doucine*, or Direct *Gueul*,	1 ½ — 3
A *Liſt*	½ — 1 ½
An *Abacus*	1 *per Bas* ½
A *Frieſe*	5 —
A *Roundel*	1 — 2

Below there is yet another *Liſt*, which belongs to the *Entredeux*.

A *Liſt*	1 — 1

The Parts of the Lower Cimatium, *are*

A *Plinth*	4 — 8
A *Torus*	3 — 8
A *Doucine* Reverſt	3 — 5 ½
A *Baſton*	1 — 2

And above a *Cincture*, which belongs to the *Dee*.

A *Cincture*	1 — 1

There might be added an *Attick Baſe*, which is common to this, with the two preceding *Orders*. Or elſe there may be made a *Baſe*, compounded of the *Attick* and *Ionick*, which will be particular.

The Parts of the Compoſite Baſe, *are*

A *Plinth*	6 — 7
A *Torus*	4 — 7
A *Liſt*	1 — 4 ½
A *Scotia*	2 — 2 ½
A *Liſt*	½ — 2 ½
A *Baſton*, or *Roundel*,	½ — 3 ½
A *Liſt*	½ — 2 ½
A *Scotia*	1 ½ — 2
A *Liſt*	½ — 2 ½
A *Torus*	3 — 3 ½

And above there is a *Cincture* which belongs to the *Trunk*.

A *Cincture*	1 ½ — 2

The *Capital* is compoſed of the Parts of the *Corinthian* and *Ionick*: It hath a *Cimatium* like to the *Corinthian*; a little Space of two Parts, whence ſpring the *Voluta's*; and then an *Ovum*, a *Baſton*, and a *Liſt*, like to thoſe that are in the lowermoſt part of the *Ionick Capital*. The *Voluta* is the ſame as the *Ionick*, having as much of the *Front*, as the *Cornure* of the *Corinthian Abacus*, that is to ſay, four Parts, or a little more. It ſprings from the Foot of the *Flower*, and its *Eye* is terminated by the Upper-ſide of the *Baſton*, or *Roundel*. The *Capital* from the *Abacus* is divided into three Parts; the uppermoſt is allow'd to the *Voluta*, and the other Ornaments drawn from the *Ionick Order*, and the lowermoſt to the *Foliages*.

An *Ovum*	2
A *Liſt*	1
An *Abacus*	3
A little *Space*	2
An *Ovum*	5
A *Baſton*	2
A *Liſt*	1
The *Space* of the Upper *Foliage*,	12
The *Space* of the Lower *Foliage*,	12
A *Roundel*	2
A *Liſt* belonging to the *Trunk*,	1

Amongſt the Antiquities of *Rome*, there hath been found a very great number of *Capitals*, which not belonging to any of the four *Orders* are to be attributed to the *Compoſite*; becauſe they have almoſt all the principal Meaſures of that which is compoſed of the *Ionick*, and *Corinthian Orders*, here deſcribed oftentimes in the place of *Voluta's*, *Rollers*, or *Tigets*. There are *Eagles*, *Griffons*, and other *Animals*; and in the place of a *Flower* there are *Faces*, and other things.

The *Compoſite Entablement* hath its principal Diviſions, the ſame as the *Corinthian*.

The

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The Cornish *hath for its Parts.*

A *List*	1½	36
An Half *Doucine*, or Streight *Gueul*,	5	from 31 to 36
A *List*	1	31
A *Doucine*	2	30½
A *Roundel*, or *Baſton*,	1	29
A *Corona*	5	28
An *Ovum*	1½	19½
A *List*	1	18
A *Doucine*	4	17¼
Dentelets, or *Denticles*,	8	14
A *List*	1	8
An *Ovum*	5	7

The Parts of the Frieſe, *are*

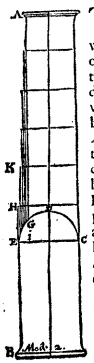
A *Roundel*, or *Baſton*,	1	2
A *List*	½	1½
The *Frieſe*, properly ſo called,	25½	

The Parts of the Architrave, *are*

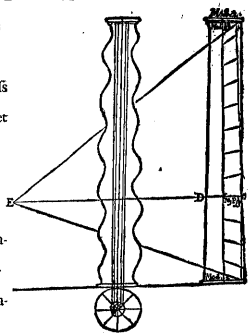
A *List*	1		7
An *Abacus*	2	Below	5
An *Ovum*	3		5
A *Roundel*	1		3
A *Faſcia*	10		2
A *Doucine*	12		1¼
Another *Faſcia*	8		

I ſay nothing here of the *Intercolumnium* without *Portico's*, or with *Portico's*; of the *Impoſts*, and of the *Arch*; becauſe that the *Meaſures* and *Diviſions* are the ſame in this *Order*, as in the *Corinthian*, from which it need not differ except in the *Capital*, and the *Pedeſtal*, though I have here ſet down ſome other differences.

Of the Diminution and Eaſleurs of Columns.



THe *Diminution* of *Columns* is made ſeveral ways; but it will be ſufficient to give Examples of the two chief of them. For the firſt, Let the *Column A, B*, be divided from a third Part upward. Let the *Semi Circle E, D, C*, be made at the Point *E*, and from *A*, the Point of *Diminution*. Let the *Line A,G*, be let down perpendicularly; then let the Point *E,G*, be divided into as many equal Parts as you pleaſe: For Example, into ſix; and let *E, A*, be alſo divided into other equal Parts; and when the *Perpendicular* and *Horizontal Lines* ſhall cut each other, draw the *Line E, H, I, K*, which will give the *Diminution* deſired, and the ſame way be made uſe of in the *Tuſcan*, and *Dorick Orders*.



This other way, though it be leſs common, yet is eaſie to be conceived by the *Lines*. Then the Meaſure of the *Columns* being agreed on, a *Line* is to be drawn *ad Infinitum*, beginning at *C*, and continuing through *D*. Afterwards bring back the Meaſure *C, D*, to the Point *A*, until it cut the *Perpendicular* at the Point *B*; and *A, B*, being continued to *E*, from thence there may be drawn as many *Lines*, as you pleaſe; which parting from the *Perpendicular*, will tend directly to the Circumference of the *Column*; upon which applying the Meaſure *C, D*, you will there have the *Enfleur* of the *Column*, as well above as beneath: And this way may be applyed to the *Ionick*, *Corinthian*, and *Compoſite Orders*.

But if it be thought fit to make theſe *Columns* Wreathed, after the manner of thoſe which are at St. *Peters* at *Rome*, there muſt be a *Plane*, as is here mark'd, and that little *Circle* in the middle ſhews how it is to be Wreath'd; which being divided into 8 Parts, and 4 *Lines* being drawn parallel to the *Perpendicular*, the whole *Column* is to be divided into 48 Parts; and this *Spiral Line* form'd through the Middle, which ſerves for a *Center* to the *Column*, upon which is to be ſet forth the bigneſs of the *Column Strait Line* by *Line*, as it is here repreſented. But it is to be obſerv'd, that the four Numbers, 1, 2, 3, 4, mark'd upon the *Plane*, are only to ſerve as far as the firſt half *Story*, in regard the beginning parts from the *Center*, muſt be continued from thence upward about the little *Circle* unto the laſt half Story above; where alſo the 4 firſt Points below are to be made uſe of.

Remarks.

THe *Roundels*, or *Baſtons*, are deſigned by a *Demy-Circle*. The *Ovum*, or *Quarter* of a *Round*, by a *Quarter* of a *Circle*. The *Gueul* Reverſt, or *Doucine*, by the Sixth part of a *Circle*, deſcribed with the *Equilateral Triangles*, in ſuch ſort that the *Crooking* from below be inward, and the *Crooking* from above be outward. The *Streight Gueul*, or *Demy-Doucine*, is deſign'd at the *Doucine* it ſelf, only with this difference, that the *Bending* from below is outward, and that from above inward. The *Abacus* is deſign'd by an *Arch*, deſcribed with an *Equilateral Triangle*, in the ſame manner as the *Scotia's*, and the Imbeliſhment of the *Trunk* of the *Column* towards its *Cincture*, or *Collar*.

W A R.

To the Worſhipfull John Cutts of Arkſden
in Eſſex & of Childerly in Cambridgſhire Eſq.

This Plate is humbly Dedicated by Richard Blome.

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WAR.

The Introduction.

THE Art of *War* is so noble and necessary a Study for all *Gentlemen* as well as *Souldiers*, that would fit and prepare themselves to be *Instruments* for the glory of their King, and safety of their *Country*, that without it they must be useless at home, and altogether *Strangers* to *Battles* and *Transactions* abroad. How was it possible for a handful of *Greeks* to Conquer most of *Asia*, and subdue that mighty *Persian Empire*, more likely to have given the *Law* to *Europe*, than to have received it from so small a part, and People of it; but by being exceedingly their Superiours in *Military Arts* and *Discipline*: Having for the Education of their *Youth*, their *Tactici*, or *Publick Teachers*: and their *Gymnasias*, or *Publick Schools*; by which means the *Grecian Youth* were so accustomed to *Military Exercises*, that it was a Reproach and Ignominy to any that had not learn'd to handle their *Arms*; and (as some relate) they were so trained up in their *Schools*, that they were *Fed* and *Lodged* as if they had been actually on Duty in the *Field*; which doubtless was a Method worthy of praise and imitation; for thereby in an instant they were able not only to form an *Army* of *Souldiery*, expert in the use of their *Arms*; but also to have it consist of Men, accustomed with the *Dyet* and *Hardships* of *War*.

The *Romans* (those great Examples of *Military* Worth) although they had not such *Publick Teachers*, or *Schools* to fit their *Youth* for *Arms*; yet we find they had their *Field* of *Mars*, whither the *Roman Youth* resorted to the practice of *Military* and *Warlike Exercises*; and we read, they were so strict in the choise of their *Souldiers*, that none could be admitted to, or attain the Dignity of one of the 24 *Military Tribunes* (although he was most in favour) that had not served at least five years in the *Wars*; and none that had less favour could be a *Tribune*, before he had served in the *Wars* 11 Years amongst the *Foot*, or 15 amongst the *Horse*; whereby we see, none could be an *Officer* before he had been a Long time a *Private Souldier*, judging him unfit to Command, who had not first learn'd to Obey: And their great Care in this matter, we may learn from the prudent distribution of their *Tribunes* in their *Legions*; that whereas the first *Legion* of a *Consular Army* had four *Tribunes*, which might have served in the *Wars* but five Years, yet it had two *Tribunes* which had served 11, or 15 Years, and so in course for the remaining three *Legions*; whereby they distributed as near as might be the most knowing and experienced *Tribunes* in every *Legion*. Such was the Excellency, of the *Roman Military Discipline* / *War* was the Policy of their *Common-Wealth*, the Renown of their *Families*; the Glory and Employment of Private Men; It was a dishonour to their Great Men to be overcome; and for their Followers, not to go as far as they: Their *Souldiers* went *Singing* to the *Battle*; and such as owed their Safety to their *Heels*, were forc'd through meer Shame to rid themselves with a *Halter* of their hated *Lives*. Thus they were Endowed with such Noble Courage, for which they were celebrated above any other Nation.

But why do we dazle our *Eyes* with the Splendor of either the *Grecian* or *Roman Arms*, or be so unjust to our selves as to diminish or Lessen the glorious Actions of this Nation, that thereby we might only flatter Antiquity? The English has filled their *Histories* with passages as truly noble as those we read of with so much admiration in the *Grecian* and *Roman Writers*; and forein, as well as their own *Histories* do them the right to tell the *World*, how not only *Towns*, but *Provinces*, and *Kingdoms* have been the reward of their Victories, as their memorable Exploits, famous Victories, and large Conquests in *France*, *Ireland*, and *Cyprus*, &c. how they brought under *Cicily*, and carried the terror of their *Arms* into *Asia*; But withal they bid us observe, that such great and noble *Actions* were due to their great knowledge in *Military Arts* and *Discipline*, acquired by unwearied industry and pains, when their Youth were bred up in shame of Vice, and boldness to undergo peril for Vertues sake; For it is certain, as *Plutarch* speaks of the *Lacedemonians*, in his Life of the *Theban General*, *Pelopidas*, *That it is neither* Eurotas, *nor the place betwixt* Babyx *and* Gnacion (*Rivers* in and about the City *Lacedemon*, then famous for brave Souldiers) *that bringeth forth Valiant and War-like Men*: There is in most Men a kind of Fear that is born with them; few with *Hercules* in the *Cradle* dare encounter and strangle *Serpents*. It is true, in some few Youths we may discover a certain kind of greatness of Mind, that betimes by their forward and lively *Spirits*, and by some brave excursions of Mind, may give sure Signs of their innate Courage; yet we must do so much right to *Discipline*, as to acknowledg, that Valour rather Springs from that than from any Prerogative of Birth; and thus that Man

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that hath been afraid at the very Name of *War*, when brought (as it were) to see and handle the Dangers thereof; and when he perceives, that *Death* is not certain in *Battles*, that but a few Fall when it is couragiously fought, and that his *Fears* have often deceived and fooled him, now dares be one in the hardest Service, and can meet the most threatning *Dangers* boldly and chearfully, obtaining that by Experience, which he never had by Nature. Where *Courage* is natural, *Discipline* must have the refining and ordering of it, before it be genuine and true. And it is certain, where *Courage* is not innate, *Discipline*, when applied, never fails to produce it. The *Thebans* (which till the Day they obtained the Victory against the *Lacedemonians*) had no Reputation of Valour; yet by Exercise and Use of *Arms*, under their Experienced and Skilful *Generals*, *Epaminondas* and *Pelopidas*, are too hard for the Brave *Spartans*, who before were accounted the most Valiant People of *Greece*.

It is not to be doubted, but that the Old *English* Valour is still the same, although it were to be wished, that Young *Gentlemen*, and Persons of *Quality*, were more inclinable, in imitation of the Noble performances, and Illustrious exploits of their Ancestors; to acquaint themselves with *Military Exercises* and *Manly Employments*, that by their acquired Knowledge joyning with their Genius, they may be an Ornament to a worthy Posterity, in being serviceable to their *King* and *Countrey*, like that brave and resolute *Spartan*, *Isadas*, in a Just and Honourable *War*, whenever they shall be called to the *Field*.

And can there be any greater Encouragement to set about the practice of this so Great and Noble a Study, than to be blest with a *General* to your *Armies*, and an *Admiral* to your *Fleet*, in the Person of a *King*; and of as Active a Temper, and Warlike Spirit, as either the *Greeks Alexander*, or the *Roman Cæsar*, who has Courage to lead you as far as yours dare follow; and wise Conduct to raise the Glory of this Nation as high as you can wish; and who (without doubt) will take notice of such as endeavour to render themselves thus fit for His Service.

I do not design in this small *Treatise*, to speak of the handling of *Arms*, nor of the several *Postures*, and *Motions*, taught the *Souldiers*, nor of the divers ways of Exercising a *Troop*, or *Company*; since there is in the *English* Language so many *Printed Books* on this Subject: And that which would make one the less curious in doing it, is, because (though there be a great many fine things taught in these particulars, which are graceful to the Sight, and makes *Souldiers* the more ready) yet when they come in earnest to Fight, few of them are practised but to keep their *Ranks* even and close, their *Files* right, to *Fire* nimbly, to *Charge* boldly, to be watchful of the *Word* of *Command* from their *Officer*, and to be exactly Obedient to it.

I shall only Discourse a little of the three *Principal Heads* in the Art of *War*, viz. *Marching*, *Incamping*, and *Imbattelling* an *Army*, which if rightly understood, with the following *Treatise* of *Fortification*; of *Defending* and *Besieging* a *Town*; the Ingenious *Souldier* will find them very useful Instructions to him in divers occasions.

Of Marching an Army.

BEfore the *Army* comes to their *Rendevouz*, in order to March, the *General* sends an *Officer* with some *Horse* to the Neighbouring *Villages*, to have a sufficient number of *Guides* of those most knowing of the *Country*, and *Ways*, he designs the *Army* shall March, and to bring them to his Quarters, which must be always near the *Generals*, and there kept, especially if Men not thorowly known, and to be trusted. To this *Officer* the *General* gives the Title of, the *Captain* of the *Guides*. Having (upon the diligent comparing of their Informations) resolved on the way to March, after the *Reveil* is beaten, all the *Wagoners* and *Men* that attend the *Baggage* are to take up their *Horse* and *Oxen*, and make ready to load. The *Vag-Masters* (whose Duty is to Mend the *Ways*, and Conduct the *Baggage*) are to come to the *Quarter-Master-General* of the *Army*, to receive his Orders. And being instructed in the Way the *Army* is to March, he is to provide himself *Guides*, and to Assemble together all the *Baggage* of the *Army*, whose *Colours* they must follow, and March according to the Rank of the *Regiment* they belong unto, and according to the place the *Brigade* is ordered to March in, whether in the *Van*, *Body*, or *Rear*.

After the *Army* is formed into as many large *Squadrons* and *Battalions* as the *Ground* or *Field* (where they are drawn up) will admit of, and according to their number regulated into the *Van*, the *Body*, and the *Rear-Gaurd*; all the *Ordnance*, *Carriages*, and *Baggage* being drawn up on one side, ready to fall into their places, as the *Army Marches* off; The *General* gives Orders for the *Van* to begin their *March*, which for the first day is always begun with his *Regiment*, and therefore is drawn up on the Right; and afterwards every *Regiment* is to take it by turns according to its Priority, being a *General Officers*, and Antiquity being a *Colonels*. Then he sends out *Guides*, and *Light-Horsemen* to discover the *Ways* and *Passages*, yet so that they keep always in sight of the *Van-Gaurd*, that upon the discovery of an *Enemy* they may give notice thereof in time. With the *Van* he orders the *Carpenters* of the *Train*, and most of the *Pioneers* to march for the mending of such *Bridges* that need it, or shall be judged insufficient to bear the weight of the *Carriages*, &c. and when there are bad Ways for the *Horse*, or *Train*, to mend them against the *Army* comes up.

The *Ordnance* and *Ammunition* do ordinarily march in the Center, or Body of the *Foot*, as adjudged the secures place from the Attempts of the *Enemy*; for if the *Attack* be in the *Van*, or *Rear*, or both, half the *Army* will be free from the Incumbrances of the *Carriages*, and will be ready to make Head where need requires; but sometimes, as Necessity requires, some small *Field-Pieces* March in the Head of an *Army*, especially when the *Enemy* is expected to Fall on.

'Tis impossible to give a certain, or standing *Rule*, for the most advantageous, and safe way of *Marching* an *Army*, since the *Form* must vary according to the *Country* you march in, or the *Enemy* you have to do withal; although you are to observe, when ever the *Ground* will allow of it, as in *Marching* over a *Heath*, or large *Field*, always to march in *Battalia*; and if the *Army* can't, yet at least that the *Horse* and *Foot* do march in as large *Squadrons*, and *Battalions* as the Ground will admit of.

The *Chief Officer* that commands the *Rear-Guard* gives Order that some Troops of *Light-Horse* shall march within sight of the *Rear*, especially in passing over a *Heath*, *Forest* or the like; but if the *Countrey* be *Mountainous*, or *Hilly*, then the *Light-Horse* may be commanded to march sometimes in the *Van*, and sometimes in the *Rear* of the *Army*, and to keep such *Watches*, and *Centinels* on the high places, that the *Enemy* may not discover the strength of the *Army* as it passes, or in what order it marches.

In passing through narrow Ways, the *Van-Guard* is generally strengthned with some *Foot* and some *Ordnance* drawn up before it, lest the *Enemy* should surprise it, and then march up by *Desiles*, and draw up as the condition of the place will permit.

In passing through a great *Wood*, there ought to be placed good store of *Horses* upon the Ways that lead into it, and to round and guard it very well on both sides, to be secure from the Enemies *Ambuscadoes*, and if there be any plain, or open places in it, the *Horse* are to over-spread them, and to be drawn up to secure the Passage until the *Ordnance* and *Baggage* are past, and the *Rear* brought up; And if after the passing the *Wood* the *Army* come into a plain *Champain Country*, some *Horse* are to guard the Way that comes out of the *Wood*, until they be drawn up again into large *Squadrons* and *Battalions*.

When an *Army* is to march through a *Country* where there are many *Brooks* and *Rivers*, *Bridges* are to be made, which is easily done, if there be good *Ingeneers*, *Carpenters* and store of *Workmen*. The *States* of *Holland* provide their *Army* continually with some *Boats*, laden with *Planks*, *Spars*, *Beams*, *Anchors*, and *Cables* drawn upon *Block-Wagons* by 10, or 12 Couple of *Horses*, where coming to a *River* they presently take them down as many as they have occasion for, cast out their *Anchors*, joyning them together, laying the *Planks* and *Boards* upon them, so in an instant a Bridge is made for their *Army*, *Carriages*, &c. to pass securely. Sometimes *Bridges* are made with empty *Barrels* and *Hogs-heads*, laying *Planks* over them and fastned together. Now for the securing the *Bridges* whilst they are marching over, there should be some Pieces of *Cannon* drawn up, and planted by the *River-side*, to annoy the *Enemy*, if they should force their Passage over it; and when the *Bridge* is laid over, some *Fire-Locks*, *Half-Pikes*, and *Horse* should march over to make good the other side, until all the *Army* with the *Canon* and *Baggage* are come over. If the *River* be fordable, but rapid, and above Kneedeep, the strongest *Horse* by turns are to stand in *Files* in the *River* on the upper and lower sides of the *Ford*, that the *Foot* may pass the safer between them, the upper *Files* breaking much of the rapidness of the Stream, and the lower saving such of them that by the violent Current might be cast down.

There are several other cases which must be provided against, as emergencies happen, by the *Care*, and *prudence* of the Chief *Commander*, for which no positive *Rules* can be set down, but the Orders must be given on the place, and proportionable to the *Ground*, the *Enemy*, and the *Occasion*.

Of Encamping an Army.

WHen an *Army* is to *Encamp*, and *Quarter*, especially not far from an *Enemies Country* (although but for a Night,) the *General* sends out to view and inform himself of the Nature and Condition of that place where they design to *Encamp*, which must be a place (if possible) in a plain *Field*, near *Water*; to which place the *Army* being come, and that in good time by Day, the *Quarters* may be made near unto the adjoyning *Villages*, if there be any; and the *Horse* Lodged about them in the most suspected places of Danger. To this end, the *Quarter-Master-General* is to go with the *Camp-Mareschal* that is upon Duty, to the appointed *Camp*; and being there come, he divides the *Ground*, distributing it to each *Quarter-Master* of the respective *Regiments* of *Foot*, and *Troops* of *Horse*; then he takes up a *Quarter* for the *General*, in which he marks out the *General Officers Quarters*, and of all those that have right to be there. He also takes care for the *Artillery*, and for the *Provisions*, which must be near the *Army*, and covered by it.

When an *Army* comes to be *Encamped* near the *Enemy*, and that there is no *River* betwixt them, the *General* gives Orders to *Intrench* his *Army*, and the greatest part of the *Troops* must not go to Rest, each *Regiment* placing a *Guard* at the *Head* of their *Camp*, and the *Camp Mareschal* that is upon Duty takes care to place the main *Guard* about a Mile beyond the *Army* towards the *Enemy*, choosing for that purpose a place from whence they may discourse all round about them, and there the *Guards* must stay until 'its Day; but when the Night approaches, they must draw near the *Army*; putting themselves at the Head of the Foot. The *Collonel* that is upon the *Guard* orders another *Guard* to be more advanced than where he is, of about 20 *Horse*, commanded by a *Quarter-Master*; this *Guard* must be advanced a *Musket-Shot* from the great or main *Guard*, in a place where they may see all about them. Besides this *Guard* there must be made a *Detachment* of about 50 *Horse* commanded by a *Captain* to march all about, especially upon the

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the ways that come to the *Camp*, that the *Army* may not be surprized.

It is not found that the *Romans* (who were the great *Masters* in *Military Arts* and *Discipline*) ever used a *Line* about, or *Intrenched* their *Camps*, until such time that they had vanquished *Pyrrhus* King of *Epyrus*, lying always before in open *Fields*; but finding that *Princes Army* Intrenched, they liked it so well, that afterwards they did not allow themselves to *Encamp* in *Fields*, although but for a Night, but in *Camps Intrenched*; and it is almost incredible to read, in what little time they *Intrenched* their *Camp*, and how laborious the Form of it was. So excellent was their *Military Discipline*, their *Souldiers* being accustomed to it by constant practice, whence they soon found the great advantages that attended it, together with the many Dangers, and Inconveniences that before accompanied the neglect thereof; such *Entrenchments* kept them safe, and freed them from dangers to which their *Army* was always exposed by quartering in the open *Fields*, and *Villages*, where if the *Enemy* was awake, he would fire every Night endanger the carrying or beating up some Quarter of it, whilst on the other hand, being lodged in a Body, and within an *Intrenched Line*, they were exempt from those Inconveniences; and to assault an *Army* so *Intrenched* was held so daring and dangerous an *Attempt*, that we *Read* of few that undertook it, and fewer that were successful in it. And it is certain that the *Romans* (as we find by reading their *Histories*) owed as much of their *Conquests* to their *Encamping* well, as to their other excellent *Military Discipline* and *Valour*; and it would be almost endless to enumerate what *Kingdoms*, and *Provinces* they kept in obedience by their standing *Camps*, having first wearied out their *Enemy* by such safe and beneficial delays, and then on some great advantages they would give them *Battle*, and so defeat them.

The ordinary Dimensions of an *Entrenched Camp*: 8 Foot are for the breadth of the *Ditch* round the *Camp*, the depth 5 Foot, the exterior height of the *Earth* thrown up 5 Foot, and the interiour 6 Foot; although if need be, the *Line* may be raised higher, and thicker, and the *Ditch* deeper and broader. On this *Line* are to be made some sorts of *Works*, as *Redoubts*, *Bastions*, *Tenails*, &c. which are to flank and defend the *Line*, and are to be about the distance of 720 Foot the one from the other, which is the *Point-blank* that a *Musket* doth execution. The raising the *Line* and *Works* upon it are to be distributed equally amongst the *Regiments* of Foot that are not on the *Guard*, every *Rgiment* taking according to its number of Men, his equal proportion, and every division of the *Regiment* relieving the other by turns until the *Work* is finished. Every 100 *Souldiers* are to have a Commissioned *Officer*, a *Sergeant* and a *Corporal* to supervise them, that they lose no time. If there be any *Mooriss Grounds*, they may be set with *Turn-Pikes* and *Palisadoes*, which may be taken up when the *Army Decamps*.

The manner of *Encamping* of *Horse* and *Foot* is thus; For a *Battalion* consisting of 12 *Companies*, and 50 Men in each *Company*, there is to be allowed 100 Paces. For a *Squadron* consisting of 3 *Troops*, and 50 Men in each *Troop*, 50 Paces.

From the Head of the first *Line* to the Head of the second (if there be more than one *Line*) there is commonly allowed 300 Paces, whereof 120 are for Encamping the first *Line*, so that there remains 180 Paces, for the distance between the last *Tents* of the first *Line*, and the Head of the second, the 100 Paces being allowed for the second *Line* to draw up in; and there must be as much allowed for the Front of the first *Line* to the said purpose. It must be endeavoured as much as may be, that the second *Line* be equal to the first, keeping the same distance upon the Right and Left. All the *Troops*, and *Companies* of *Horse* and *Foot*, consisting but of 50 Men apiece, are to be encamped in one Row of *Tents* and *Huts*; but when the *Troops* and *Companies* consist of more Men, there must be 2, or 3. The *Horse* are to be *Encamped* on the two *Wings*, and the *Foot* in the *Center*. The *Generals Regiment* is to have the Right, and the *Colonels Company* the Right of the *Regiment*

The particular Dimensions of the Ground allotted to the *Adjutant*, or *Quarter-Master* for the *Encamping* a *Battalion* consisting of 12 *Companies*, and each *Company* being *Encamped* in one *File*, is commonly 100 Paces, allowing 3 *Foot* for a Pace, which he is thus to divide.

The *Streets* are each to be of 6 Paces, which is in all 72 Paces; the breadth of each *Tent* 2 Paces, and ½ of a Pace, or 7 *Foot*; the Depth is according to the number of the *Tents*, and 4 or 5 Men to a *Hut*, each *Tent* taking 2 *Paces*, the distance betwixt each being usually 2 ½ *Foot*; The distance of the *Subalterns* from the *Souldiers*, is 5 *Foot*; The great *Street* between the *Captains*, and the *Subalterns*, is sometimes 15 Paces, and sometimes 20; Behind the *Captains Huts* is their *Equipage*, and at a convenient Distance the *Sutlers Encampt*; the *Pikes*, *Colours*, and *Muſquets* must be placed at the Head of every *Company*; The *Huts* of the *Foot* always to be open to the *Streets*, and those of the *Cavalry* towards the *Horses Heads*; and it is always to be observed, that every Evening after the *Tap-too* is beaten, the *Word* is to be given, after which none is to pass along the *Line* that hath not the *Word*.

To conclude, The *Quartering* the *Army* at all times, (especially when the *Enemy* is very near) ought to be in such manner, as that the *Souldiers* may be sooneſt in *Battalia* to receive them, that is, that such *Forces* as compose the *Wings* and *Body*, may have only to go out of their *Huts* and *Tents*, to be in the *Figure* you design to fight in; else in case of an *Alarum*, the dangers will be many, and great.

Of Giving of Battle.

AS there is no Act of *War* so great in it self, or in the consequences thereof, as *Fighting* or giving *Battle*, the Advantages being eminent to the *General* that wins it, and the Prejudices many and considerable to him that loseth it; so nothing ought to be more exactly weighed, and judiciously considered, and hardly any thing more essentially to be studied by a *General*, than perfectly to know, and lay hold on all the Advantages in the Day of *Battle*, and to know all the Disadvantages, to avoid them.

The *Ranging* an *Army* in *Battle* to the best Advantage is a great step to the winning the Victory; which depends not only on the Wisdom, and Skill of the *General*, the nature of the Ground, and the quality of his own Forces; but also on those of his *Enemies*, and on the disposition of him that commands them. And although no certain, or standing *Rule* can be given to answer all these *Varieties*, yet some positive *Maxims* may be set down, which if punctually observed may beneficially answer all occasions that may fall out; for we find that even the greatest *Captains* of antient times (whose *Military* knowledge, and Practice the Moderns extol and value) have not ever observed one and the same Form of giving *Battle*, but varying as occasion offered.

Cæsar at that memorable *Battle* fought on the *Pharsalian Plains* against *Pompey*, did quite alter the manner of the *Roman Imbattleing*; for having found that *Pompey* exceedingly out-numbred him in *Horse*, he covered one of his *Flanks* with a little *River*, and drew all his *Cavalry* to the other *Flanks*; among the *Squadrons* whereof he placed Bodies of the best *Infantry*, and there he began to *Battle*; whereby having all his *Horse* on one *Wing*, and these accompanied with select *Legionary Foot*, he soon routed the half of *Pompeys Horse* that opposed all his, and then falling into the *Flanks*, and *Rear* of his *Enemy*, won the Victory.

The Maxims are as followeth.

1. TO be first drawn up on the Ground the *Army* is designed to fight on, which is always attended with several considerable Advantages, as the Honour gained by being earliest on the Spot, which animates the *Souldiers*, and often daunts the *Enemy*, having thereby the opportunity of possessing all the Advantages of the Ground, which are to be so exactly considered, and the *Field* you fight in viewed so well, that when the *Army* is drawn up, the Order of it may not afterwards be altered, or the Ground changed; for all such mutations in the Face of an *Army* are very Dangerous, giving them the greater confidence, and the *Army* the less Courage, as being an evidence to both of a great failure in Conduct. Likewise being first drawn up in the *Field*, the *Army* is in a posture to fall on, and take the *Enemy* with their *Cannon*, whilst they are drawing up, which Advantage when it may be taken, is of great use.

2. Secondly, That a *General* is never to omit in the drawing up of his *Army*, so to dispose of his *Squardrons*, and *Battalions* as that every one of them may come to fight again and again, if need requires, before they are totally routed. 'Tis also observable, that in a *Battle* who ever knows to receive a Body of Men that are not lead to fight until all the *Enemies Squardrons* have fought, rarely fails to get the Victory; and those that have the last *Reserves* are very likely at last to be *Victorious*.

3. The *Romans* constantly fought their *Infantry* in there *Lines*, or Orders of *Battle*; the one behind the other, if the *Hostatii* were worsted, they fell between the Intervals of the *Principi*, and there Rallied again, whilst the *Principi* advanced; and if both the *Hostatii* and *Principi* were routed, they fell in between the Intervals of the *Triarii*, and if those could not sustain the Shock, the Day was lost.

4. Thirdly, to have expert, vigilant and valiant *Commanders* to be at the Head of the five gross Bodies, of which an *Army* is usually composed in the Day of *Battle*; *viz.* the three *Tertias* of the *Infantry* (which as they March are called the *Van*, the *Body*, and the *Rear*) and the two *Wings* of the *Cavalry*, and this in the second *Line*, as well as the first (the distance between them being 300 Paces) since it is easier to attack well whilst all is in Order, than to recover a disorder when once hapned. With these *Officers* 'tis of great importance to have an able *General* of the *Artillery*, and that he have sufficient *Officers* under him. That the *Carriages*, *Ammunition*, &c. be in good order, and the *Cannon* early, and well planted, as that the *Shot* may rake thwart the *Squardrons* and *Battalians* of the *Enemy*, which will not only do great execution, but also disorder Bodies of the *Enemies Infantry* and *Cavalry*.

5. Fourthly, Always place the best of the *Souldiery* in the *Wings* of the *Army*, and to begin the *Battle*, on that side of the *Army* which is strongest, and the *Enemy* the weakest.

This ha's been a very antient Method, and seldome has been omitted, but to the loss of those that are guilty of such omissions; and the reason is clear, Because the *Troops* on the *Wings* are not wedged in, as the *Troops* in the main *Battle* are, but are at liberty to make all the Advantages that by Accident, or the ill Conduct of the *Enemy* may be offered; and it cannot rationally be expected to fall upon the *Enemies Flanks*, and *Rear*, but by attacking them on the *Wings*, which must be done as expeditiously as possibly (without disordering the *Troops*) whilst the rest of the *Army* moves as slowly as they may; and if the first Attack be successful, then there is opportunity to fall into the *Flank*, and part of the *Rear* of the *Enemy*, whilst the residue of the whole *Army* is marching to Attack them in the *Front*, which must be quicker in motion when they see the advanced *Wing* successful. None are to speak but the *Commander* in chief, or the *Major* by his Order. In advancing against the *Enemy* in *Battle* out of their *Musket-Shot*, the *Captains*, and other *Officers* at the Head of the *Battalions*, are all to march in a *Line*, with their *Pikes* in their Hands two good Paces before the *Souldiers*, and are often to look behind them, lest they should insensibly get too much before the Body, and the *Souldiers* by following too fast, fall into Disorder, at which time the *Ranks* are to be two great Paces distant, and the *Files* closed in such manner that every *Souldier* may march at his ease, and so Charge and Fire without pressing one upon another, which wonderfully causeth breach of Silence in the *Battalion*.

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When the *Army* comes within Shot of the *Enemy*, and the *Musqueteers* march ready with their *Pans* guarded, instead of the *Ranks* being closed forwards to the *Swords-Point* (which is usual) there is the distance of one Pace to be allowed between the *Ranks*, and then the whole Line of *Captains*, and other *Officers* are to retire each of them into the Intervals of his *Files* next after his *Post*, yet so as they may look to the right and left of the *Battalions*.

As soon as the *Battalions* come to 30 Paces distant from the *Enemy*, the *Musqueteers* are to *Fire*, the manner of which *Firing* being ordered them before.

The *Officers* Commanding the *Rear*, are to observe that the *Battalions* keep marching, to cause the *Souldiers* to close forward easily, and without noise, or confusion, that the *Pikes* march even with the *Musqueteers*; for if the *Pikes* be even on the right and left, the *Battalion* can't be disordered by its March.

The *Granadeers* (if any) are to be drawn up on the Right of the *Battalions*, and to augment them without intermixing with them, they being a separate number of Men that are always to be ready for whatsoever shall be Commanded them.

The Commanders of the *Battalions* may be on *Horse-back* at the Head of them, by reason they are to be stirring to all parts, to see that the distances be observed; and above all, that none speak except himself, or the *Major* by his Order, although he is to alight when the *Musqueteers* make ready, and is to March with his *Pike* charged against the *Enemy*.

Fifthly, The last *Maxim* is, To prohibite and forbid under severe Penalties, the absolute *Chase*, or *Pillage* until the *Enemy* is totally routed on all sides; and then have those *Troops* only to pursue, that are expressly appointed for it, always having *Squadrons* to march after the pursuers as near, and in as good Order as if they were going to the Charge, that if the pursued should Rally, and face about, those *Troops* and *Squadrons* may be ready to fall on, and break them a second time. This is of such importance, that a great many *Victories* seemingly won, have in an instant been lost for want of due care in these two particulars, and therefore ought never to be omitted; for there is nothing that more incourages flying *Enemys* to rally and fight again, than the seeing a disorderly pursuit of them.

And if *Hanibal* the *Carthaginian General*, who was so excellent a Captain to win Victories, had but made this use of them during the second *Punick* War against the *Romans*, having defeated them in four great *Battels* at several places, and so routed their *Army*, that it had been easie for him to have taken *Rome*, had he not (after being 16 Years in *Italy*) been forced to fly into *Africk*, overcome by *Scipio*, and been obliged to beg peace of him.

FORTIFICATION.

OR,

The Art of Rendring a Place Defensible.

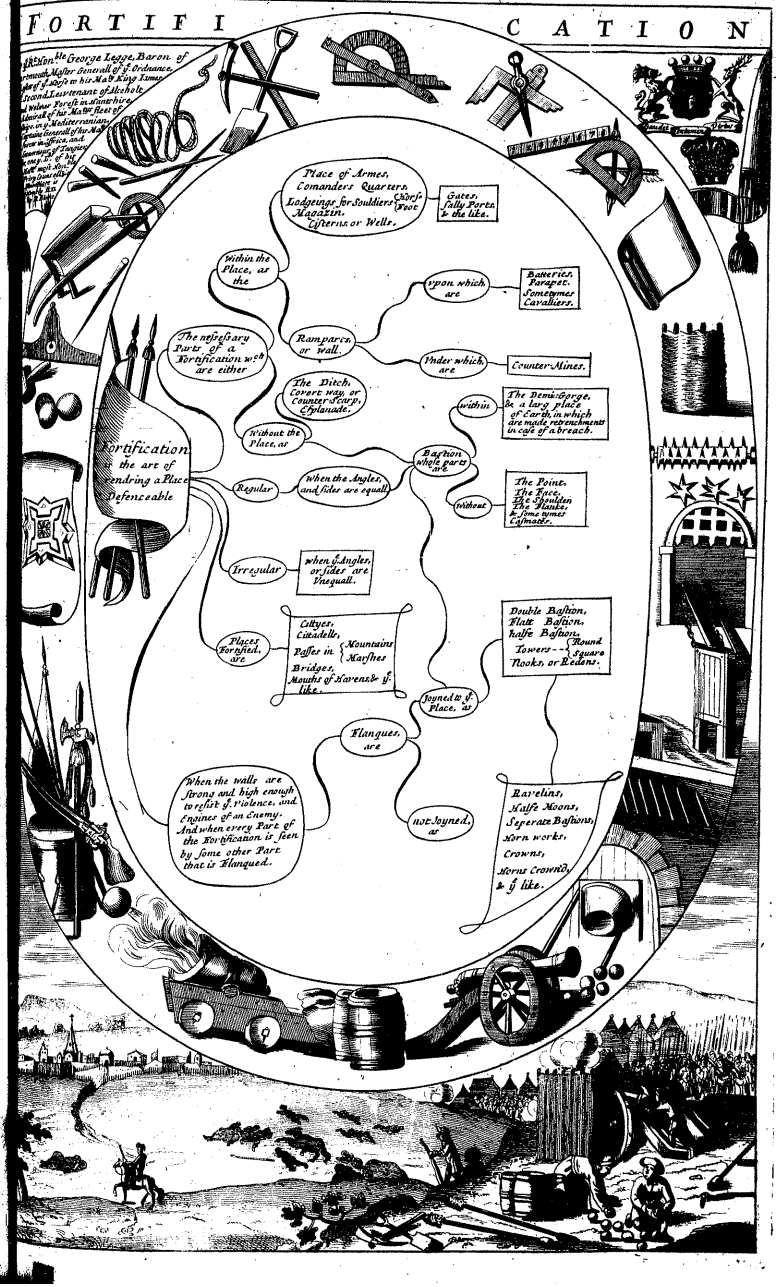
THat as nothing is at one brought forth to perfection in any *Art* or *Science*; so in this of *Fortification*. At the first beginning the People (as *Cæsar* in his *Commentaries* on the Wars with the *Gauls*, tells us,) and as it is amongst the *Indians* at present) were wont to surround their *Towns* with *Piles* driven into the Ground in manner of an *Impalement*, as by this *Figure* appears.

But when they found that the Fury of an attempting *Enemy* (as well as *Fire*) would soon destroy these *Wooden Retreats*, they began to build high and thick *Walls*, defending the same from the Top, by throwing down *Darts*, *Arrows*, and *Stones* to annoy the *Enemy*, according to this *Figure*, as

Curtius observes of the *Babylonian Walls*, which were 150 *Foot* high, and 32 *Foot* thick.

Experience, the truest Censurer in this matter, finding the Imperfection and Disadvantage of this sort of Structure, that the Defenders standing on the Top of the *Walls* were no more safe from being exposed to Danger, than the *Enemy* without; and that they could never hit or annoy them any more when they were come near to the Foot of the *Wall*, unless they stood on the very Edge of it, where bowing themselves to discover the *Enemy* at the Bottom, must be exposed to the danger of Tumbling down; and therefore the *Besiegers* being hidden, it was no hard matter for them to place there *Battering-Rams*, and other *Engines* (then in use) to force down the *Walls*, and so get into the *Town*. For the remedying this, they were forced to make *Loop-Holes*, or *Windows* below in the *Walls*, according to this *Figure*, out of which they annoyed the *Enemy*.

But


FORTIFICATION
Fortification the art of rendring a Place defenceable
Regular
When the Angles and Sides are equall
Bastion whole parts are
within
without
The Demi-Gorge, Be a long peice of Earth, in which are made retrenchments in case of a breach.
The Point, The Face, The Shoulder The Flanke, & some times Casmate.
Irregular
when Angles, or Sides are Unequall.
Places Fortified are
Cityes, Citadells, Passes in Mountains Marshes Bridges, Mouths of Havens &c like.
Double Bastion, Flatt Bastion, Halfe Bastion, Mound Towers, Square Nooks, or Redans.
joyned to the Place, as
Flanques are
When the walls are strong and high enough to resist the Violence, and Engines of an Enemy. And when every Part of the Fortification is seen by some other Part that is Flanqued.
not joyned, as
Ravelins, Halfe Moons, Seperate Bastions, Horn works, Crowns, Horne Crownes, & the like.
Place of Armes, Comanders Quarters, Lodgeings for Souldiers Magazin, Cisterns or Wells.
Store house
Gates, Sally Ports & the like.
Within the Place, as the
upon which are
Batteries, Parapet, Sometimes Cavaliers.
The necessary Parts of a Fortification wch are either
Rampiers or wall.
Under which are
Counter-Mines.
The Ditch, Covert way, or Counter Scarp, Esplanade.
Without the Place, as

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But it was found, that at the *Enemies* approaching the *Wall*, they were secure betwixt these two *Loop-Holes*, or *Windows*, within the *Triangle a, b, c*, according to this *Figure*; therefore they invented Square-flanked *Towers*, parallel to the *Wall*.

The *Besieged* finding the Fore-part of the *Tower* to be out of sight, and the *Angles* easie to be Battered by their *Rams*; and there yet remaining a *Triangle a, b, c*, in which the *Enemy* was hid, they changed them to Round ones; by which means a Remedy was found against the most pressing Force, threatned either by the *Rams*, or other Ancient *Engines*, which by their *Battering*, instead of loosing the *Stones*, forced them towards the *Center*, and made them stick closer together; and although there was a little *Triangle a, b, c*, according to this *Figure*, yet they could not unfasten the *Stones* without great difficulty, and by adding a few *Windows*, all Danger (if any remained) was taken away.

Thus the Ancient manner of *Fortifying* at last was in this Structure of round *Towers*, and so continued until about the Year of our *Lord* 1359, one *BARTHOLDUS SCHUART*, a *German* Monk at *Collogne*, invented that admirable Composition of *Gunpowder*, which was soon after followed with that of the *Musquet* and *Cannon*; so that by this means the manner of Warring was changed from the *Battering-Rams*, to the *Thundring* of *Guns*; and the *Round Towers* (which were not altogether flanked by the *Besiegers Fire*) were turned into *Bulwarks* and *Bastions*, with sharp Points towards the *Campaign*, defending and flanking one another without the least hidden place to the *Enemy* to lodge themselves in, having thick and solid *Ramperts* of *Earth*, behind their *Walls*, to resist the Violence of the *Enemies Batteries*; the which are in use to this Day.

CHAP. I.

Of the Terms, *and* Angles, *relating to* Fortification, *Illustrated by the Letters of the Alphabet, as well on the* Ichnography, *or* Ground-Plot, *as on the* Orthography, *or* Profile; Scenography, *or* Perspective.

Of the Ichnography, *or* Ground-Plot Lines. *Plate* I. *Fig.* II.

A, Is a *Polygone*, or a Figure made of several *Sides* and *Angles*.

B D, is the *Radius*, or distance from the *Center* of the *Polygone*, and represents the *Wall* that surrounds a place.

A, a, is the Exterior circumference, or *Polygone*, that passes by the Points of the *Angles* of the *Bastions*.

V, X, F, G, H, is the *Plane* of a *Bastion*, on which there is to be raised a thick and solid mass of *Earth*, sometimes lined with *Stone*, or *Brick*; Their use is to contain under Covert a sufficient number of *Musqueteers*, and to plant the *Artillery* theron to scour the *Campaign* and *Ditch* round; a place to Flank and defend the Body thereof, and by their solidity the better to resist the force of *Mines*, and make *Retrenchments* behind *Breaches*, if need require; and they are to be large, that *Granadoes* do not much Execution on them.

Royal Bastions are such as are not able to resist the force of an *Army Royal*, being so called when there is a *Train* of *Artillery* brought into the Field to attaque the place. *H V*, is the *Gorge* of the *Bastion*, or the distance between the two *Flanks* of the *Bastion*, and is the Ground where ordinarily the Besieged make their last *Retrenchments*.

C V, is the *Demi-Gorge* of the *Bastion*, or the distance from the *Angle* of the *Polygone* to the *Angle* of the *Curtain* and *Flank*.

C F, is the *Capital* of a *Bastion*, or the extension of the *Radius* betwixt the *Angle* of the interior and exterior *Polygone*.

F G, is the Face of a *Bastion*, or the part of the *Bastion* that extends it self from the Point of the *Bastion* to the *Flank*, and is the weakest part in all the *Fortification*; because of its being more exposed to the *Besiegers Batteries*; and being only defended by the opposite *Flank*, is the place where the *Enemy* ordinarily makes their Breaches, to which they pass their *Galleries*, and where they generally make their *Mines*.

H G, is the *Flank*, or the Line raised from the extremity of the *Demi-Gorge* to the Face. This is the *Post* from which the *Besieged* defend the *Curtain*, and the opposite *Flank* and *Face* of the *Bastion*, scouring the *Ditch*, *Counterscarp*, *Glacis*, and other Out-Works, which is the reason why the *Besiegers* endeavour by their *Batteries* and *Artillery* to ruine the *Flanks* at the beginning of a *Siege*.

H, is a *Cazemat*, and *Orillon* which covers the *Cannon* in the *Flank* from being dismounted at any distance, and to this end obliges the *Enemy* to raise their *Batteries* almost under the *Besieged's* Fire.

H I, is the *Curtain*, or the part of the side of the *Polygone* that is between the two *Demi-Gorges* of the two opposite *Bastions*; This is the part best defended in all the *Fortification*, being thus secured by the two opposite *Flanks*, and for this reason the *Ports* and *Gates* of a *Town* are ordinarily made in the midst thereof.

P Q, is the plain of the *Rampert*, or the *Terrase* of the *Town*.

P Z, is the *Parapet* or *Breast-work*, that covers the *Musqueteers* that are on the *Rampert*.

H I,

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H I, is the second *Flank*, or that part of the *Curtain* which defends the Face of the opposite *Bastion*.

H E, is the *Line of Defence*, which extends it self from the *Angle* of the *Flank* and *Curtain*, to the Point of the opposite *Bastion*, and is not to exceed the *Point-Blank* distance of a *Musquets* execution.

I E, is the *Stringent Line* of Defence, which determines on the *Curtain* the length of the second *Flank*, the *Flanks*, and the *Faces* of the *Bastions*.

F, E, N, is the *Ditch* that goes round a place out of which the *Earth* is taken that makes the *Ramperts*.

R, T, M, S, is the *Counterscarpe*, or the Edge of the *Ditch*, that is, towards the *Campaign*.

1, 2, 3, is the cover'd Way, or *Corndor*.

4, 5, 6, is the *Base*, or largeness of the *Esplanade*, or *Glassis*, or the *Parapet* of the cover'd Way.

Of the Angles. Plate 1. Fig. 1.

IT is to be observed, that an *Angle* is mark'd by three *Letters*, and the middlemost always denotes the *Angle*.

C, B, D, is the *Angle* of the *Center*, and is made by the meeting of two *Semidiameters*, drawn from the *Angles* of the *Polygone* to its *Center*.

A, C, D, is the *Angle* of the *Polygone*, and is formed by the meeting of two sides of the *Polygone*.

X, F, G, is the *Angle* of the *Bastion*, or *Flanked Angle*, and is made by the meeting of the two Faces of the *Bastion*.

F, G, H, is the *Angle* of the *Shoulder*, made by the meeting of the *Face* and *Flank*.

C, H, I, is the *Angle* formed of the *Flank* and *Curtain*.

Of the Orthography, *or* Profile, *with the* Scenography *and* Perspective *of a* Fort. Plate 1. Fig. 2.

ENgineers use to represent the different Heights and thickness of the Earth of a *Fort* by a Section, through the middle of the *Curtain*, which they call *Profile*.

B B, is the *Horizontal Line*, on which the *Fort* is to be raised.

B, C, E, D, is the *Rampert*, or the *Solid Earth* round a place.

B C, is the *Base*, or *Foot* of the *Rampert*, the distance between the *Ditch* and the *Town*.

D E, is the *Terraplane*, or the upper largeness of the *Rampert*.

F D, is the *Interior Slope* of the *Rampert*.

E C, is the *Exterior Slope*, or *Talum*, which oft-times is lined with *Brick*, or *Stone*.

N, O, E, is the *Parapet*, or *Solid Earth*, that is raised upon the *Rampert*, to cover the *Souldiers* from being exposed to the *Besiegers Fire*.

F N, is the *Interior Height* of the *Parapet*, which is always the height of a Tall Man.

N O, is the *Superior Slope*, or *Glassis* of the *Parapet*, on which the Besieged lay their *Musquets* when they Fire towards the *Campaign*.

4, are the *Embrassures*, or *Cannon Ports*.

L O, is the *Exterior Slope* of the *Parapet*.

P, H, I, is the *Banquet*, or *Foot-Bank*, at the Foot of the *Parapet* towards the *Town*, on which the *Musqueteers* stand when they *Fire*.

C R, is the *Plane* of the *Fausse-bray*.

R, S, T, is the *Parapet* of the *Fausse-bray*.

T V, is the *Barm*, or little *Plane*, to hinder the *Parapet* of the *Fausse-bray*, which is always to be of *Earth*, lined with *Turf*, from tumbling into the *Ditch*.

V, T, X, Z, is the *Ditch*, or *Moat* that is round the *Fort*.

V T, is the *Scarp*, or *Slope* of the *Wall* next the *Ditch*.

2, is the *Cunet*, or little *Cannal* in the midst of the *Ditch*.

Z X, is the *Counterscarp*, or outward *Slope* of the *Ditch*.

Z 4, is the *Cover'd Way*, and is that which *Souldiers* ordinarily call the *Counterscarp*.

6, 7, 8, is the *Glassis*, or *Esplanade*; or the *Parapet* of the *Cover'd Way*, which slopes until it loseth it self into the *Campaign*: On the Top of this *Parapet* there are *Palisadoes* usually planted.

CHAP. II.

General Maxims to be observed in Fortification.

1. THat there be no place, or Work that is not *Flanked*, and defended by another. This is evident from what has been said already, and the common practice of an *Enemy* teaches. For the *Besiegers* ruining by their *Batteries* the *Parapets* and *Flanks*, as dismounting the *Besiegeds Cannon*, they have no other Design than to make their *Miners* pass the *Ditch*, where if they find any place out of sight of the *Besiegeds Fire*, 'tis easy for them in a little time to make their *Mines*, and so by this means betwixt a *Town Besieged* and *Taken*, there is oft times no more than the difference of 8, or 10 Days; for which reason the *Emperour Charles* the Fifth, improved the round *Bulwarks* of his Conquests, into sharp-pointed *Bastions*.

2. That the great *Line* of Defence, or that which is near equal to it, *viz.* the interior *Polygone* exceed not 120 *Fathoms*, or 720 *Feet*, which is the *Point-blank* of a *Muskets* execution; for 'tis to be observed, that the Defence is to be taken from the *Musket*, and not from the *Cannon*, seeing the *Cannon* require too many Men to manage them, consumes a great deal of *Ammunition*, are easily dismounted, and with great difficulty planted again, neither can they maintain a continual *Fire*. And it has oft times been observed, that *Engineers* to make the fewer *Bastions*, and consequently to spare a little *Mony* have committed this intollerable Fault.

3. The greater and more spacious the *Gorges* and *Flanks* are (provided the rest of the Works be not prejudiced thereby) the better is the *Fortification*.

The *Gorges* ought to be so large, that on both sides of the *Flanks Cannon* may be planted, that the *Souldiers* may go up and down to the *Bastion*, in a good *Front*, without giving any inconveniences to those that are at the *Flanks*; likewise there must be place to make *Retrenchments*, if necessity require.

The *Flanks* are the most considerable parts of *Fortification*, and from which depends the Defence of the other parts, as the *Curtain*, *Flanks* and *Faces* of the opposite *Bastions*, the *Ditch* and *Counterscarp*, &c. they are to be made so great as the just proportion of the *Bastion* will admit of; for in making them too great, the *Capitals* will become too long, and by consequence the *Line* of Defence will exceed the *Port* of a *Musket*, (which is against the second *Maxim*); or in making them too little, the *Bastions* will become obtuse, and will entirely cut off the second *Flank*, whilst we ought to have consideration for it.

4. That the *Angle* of the *Bastion* be not much less than 60 *Degrees*, or much more than 90; for being less than 60, it is so slender, as easily to be battered down; and being greater than 90, it will be more large than is necessary, and shorten the second *Flank*; and besides it shall contain less Ground than the *Bastion* of an *Angle* of less *Degrees*, built on the same *Gorges* and *Flanks*.

5. The greater the *Angle* is that is made of the outward *Polygone* and the *Face*, the greater is the Defence of the *Face*; For then the *Stringent Line* of Defence comes not so much upon the *Curtain*, and consequently leaves the greater second *Flank*.

6. All the *Works* ought to be *Cannon Proof*.

CHAP. III.

Of Regular Fortification.

IN the construction of *Regular Figures*, and how to Fortify them according to the most modern ways used by the *Italians*, *French* and *Dutch*, with the Methods of some Modern Authors.

Regular Fortification is that which is made upon *Equiangular*, and *Equilateral Figures* described in a *Circle*, such as a *Triangle*, *Quadrangle*, or four-square *Pentagone*, or five-sided *Figure* to a *Dodecagone*, or twelve-sided *Figure*; the *Bastions* being so placed that the Points of them are alike distant, from the *Center*; the *Curtains* of one length, and all the other *Lines* and *Angles* of one Form, and greatness.

Regular Figures are made by calculating the *Angle* at the *Center*, which is by dividing 360, the number of *Degrees*, a *Circle* is always divided into, and in which the *Regular Figure* is described by the number of the sides of any *Polygone*, or *Regular Figure* the *Fort* is to consist of. The *Quotient* shews the *Angle* of the *Center*. As in this *Example* of a *Pentagone*, or 5 sided *Figure*. By the operation the *Angle* of the *Center*, is found to be 72 *Degrees*, and so of any other *Figure*. Then if with a *Protractor*, or a *Line* of *Chords* you draw a *Circle*, and set off the *Angle* at the *Center*, as in the *Example* 72 *Degrees*, it will divide the *Circle* exactly into 5 equal Parts, on which strait *Lines* drawn from one Point to another, gives the sides of a *Pentagone*.

The *Protractor* is described in the Treatise of *Geometry*, *viz. Surveying*, and is nothing else but a *Semicircle* made on *Brass*, or *Horn* divided into 180 *Degrees*.

The *Line* of *Chords* is the fourth part of a *Circle*, or 90 *Degrees*, projected on a *strait Line*, such as are always upon any plain *Scale*.

The *Radius*, or *Semidiameter* of a *Circle*, for which this *Line* shews the *Degrees*, is always represented by the Brasen Point at 60 *Degrees* on the same *Line*, and if with your *Compasses* you take from the *Line* of *Chords* 60 *Degrees*, and draw a *Circle* 72 *Degrees*, taken from off the same *Line*, will go 5 times exactly round the *Circle*, and so of any other *Figure*.

Of the Italian Method according to P. Sardi.

THis Author being learned, and much experienced in the *Wars* in his time, has wrote much, and to good purpose; so that I choose him as the most approved of the *Italian Authors*. He makes the *Interior Polygone* 800, *Venetian* or *Geometrical Feet*, (which makes 921 of the *English*,) the *Demi-Gorges* 150, and the *Flanks* also 150, so that the *Gorges* and *Flanks* are equal, and in *English Feet* make 172 ½ for each, which is betwixt a ⅓ and ⅖ part of the *Interior Polygone*; He raises the *Flanks Perpendicular* to the *Curtain*; and to set off the *Faces* and *Angles* of the *Bastions* in a Square and *Pentagone*, he makes the *Line* of Defence fall on a 1/12 of the *Curtain* in the *Hexagone*, or a ⅛ Part; in a 7, 8, and 9 sided *Figures* on a ⅕; and in all above on the half. In this *Example* of a *Hexagone*, divide the *Curtain* into 4 equal Parts, from *N*. which is ¼ of it, draw a *Line* by the Top of the *Flank*, until it cut the *Radius* prolonged in the Point *a*, so you have the stringent *Line* of Defence, the *Face* of the *Bastion*, and the *Angle* required, and so a *Polygone*.

To reduce this construction to the second *Maxim*, you are to find the particular Measures by the Rule of *Proportion*, thus.

If 800 *Venetian Feet*, give 150 for the *Gorge*, how much will 921 *English Feet* give? Answer 172. Then again, If 921 *English Feet* give 172 for the *Gorge*, how much will 720 give? Answer 134.

After this manner all the rest of the Parts are found out.

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Now to the Construction. Plate 1. Figure 3.

IN the *Hexagone* drawn as before taught on the side mark't *P. Sardi*, divide the side *P, P*, into 720 Parts, at 134, or *c c*, make a Mark for the *Demi-Gorges*, set up *Perpendicular* to the *Curtain*; the same Measure for the *Flanks c, f*, and draw the *Faces* as before. These parts may be taken off from any *Sector*, or *Joynt Ruler*, or from any *Diagonal Scale* of an *Inch*, or ½ an *Inch* divided into 100 Parts.

In a Book of *Military Architecture* entituled *Corona Imperialis* written by this Author, he sets *Gazemats* and *Orillons* on the *Flanks*; Of which in their place.

Of the French Method as it is by Manosson Mallet *Author of the* Travaux de Mars. Plate 1. Figure 3.

THis Author observes the same Rules for the construction of all the *Regular Figures*, as are here given in this *Example* of a *Hexagone*.

Having drawn the *Polygone P P*, extend the *Semidiameters* by the extremities of the side of the *Polygone* marked *M. Mallet*; divide the side *P, P*, into 3 equal parts; set one of these parts, on the extended *Semidiameter* or *Radius* from *P*, to *A*, for the *Capitals*; take a fifth part of the *Polygone*, for the *Demi-Gorges*, set it from *P*, to *C*, to make the *Faces* and *Flanks* draw the *Stringent Line* of Defence, from the *Capital* to the extremity of the *Gorge*, and raise the *Flanks* at an *Angle* of 98, or 100 *Degrees* with the *Curtain*; where they cut the *Line* of Defence determines the length of the *Flanks* and *Faces*, as *c, f*, and *f, A*; With the length of this *Face* you may compleat a *Polygone* all round by Transferring it to the other *Lines* of Defence.

This Author hath no second *Flank*, he makes the *Stringent Line* of Defence, 120 *Toises*, or *Fathoms* (allowing 6 *Feet* to a *Fathom*) which is 720 *Feet*.

See Travaux de Mars *by this Author of* de Ville, *and* Furnier's *Method*. Plate 1. Figure 3.

THey Divide the *Interior Polygone* into 6 equal parts, and take one of them for the *Demi-Gorge* and *Flanks P c, c f*, both being equal, and at right *Angles* to the *Curtain*, for drawing the *Faces* of the square, and *Pentagone*, lay a *Ruler* from the extremity of the *Gorge C*, by the Top of the *Flank f*, until it cut the *Capital* in *A*; These have no *Flanks*.

For the *Hexagone*, and all *Figures* above it, joyn *f f*, by a *Line*; the *Capital* will divide it into two equal parts at *e*, as a *Center* draw the *Circle f, A, f*, at the Distance *a f*, where it cuts the *Capital* at *A*, draw *a f*, for the *Faces*.

These Authors make their *Interior Polygone* or *Line* of Defence 150 *Toises*, or 960 *English* Feet.

This Method is to be reduced to the second *Maxim* by the former *Rules*.

See *De Ville's Ingenieur Perfail*, and *Furniers Architecture Military*.

Of the Dutch Method, as it is abridged by the Emperor Ferdinand *the Third; with an Account of the Construction of the Fortifications at the* Grave *in* Holland. Plate 1. Figure 3.

THe *Dutch* have been as famous for their experience in *Fortification*, as their *Country* at present is for their fortifyed *Towns*; and by their *Engineers*, as *Dogen, Marolois*, &c. have filled the *World* full of their *Books*, and ways of Fortifying; altho they might have saved themselves the trouble, and laborious pains in calculating *Triangles*, and other *Mathematical Learning*, more for curiosity than use in this matter. For which reason the Emperor *Ferdinand* the Third found out Rules approved of, by turning their *Fortifications* out of the way of calculating *Angles* into *Lines*. He sets down this universal way of drawing the *Lines* of any *Fort*.

'Tis to be taken as a *Rule*, That if the *Interior Polygone* be 66 of any Measure, the *Gorge* must be 15, the *Flank* 12, and the *Capital* 24.

Now in proportion according to the second *Maxim*, If the *Polygone* be 720 *Feet*, the *Capital* will be 261 *Feet*, 9 *Inches*, the *Gorge* 163 *Feet* 7 *Inches*, the *Flank* 130 *Feet* 10 *Inches*, which is to be set at right *Angles* with the *Curtain*; thus by taking of these proportions from the *Sector*, you may fortify any *Figure* according to this Method.

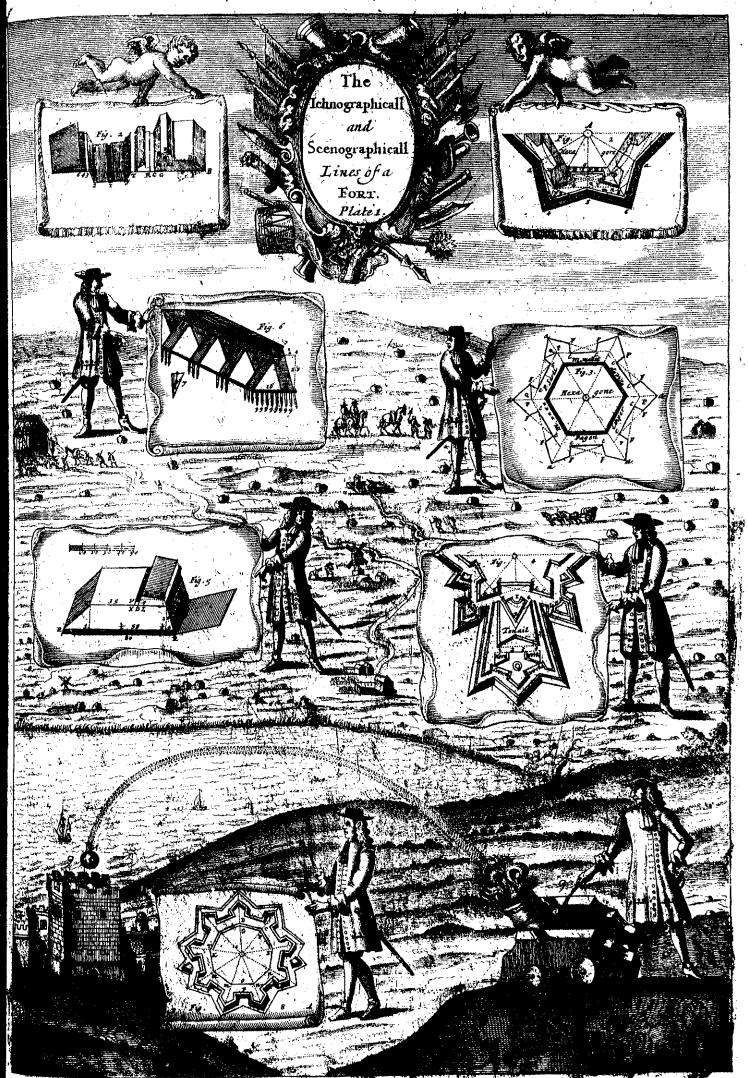
This is an abridgment or Epitomy of all the *Dutch Fortifications*, except the Square, which hath no second *Flank*.

See *Schottus Edition* of *Amussis Ferdinandea*.

The construction of the Fortification of the Grave *according to Monsieur* Storf.

HAving drawn the *Exterior Polygone A B*, of 94 *Rods*, and divided it into two equal parts in *C*, let fall the *Perpendicular C D*, of 15 ⅓ *Rods*, which is ⅛ of the Exterior *Polygone*; then from the Points *A B*, draw the *Lines* of Defence *a e*, and *B I*, through *D*, infinitely; divide the *Perpendicular C D*, into two equal parts at F, by which draw F *G*, *Parallel* to *A B*, cutting the *Line* of Defence in the Point *G*, which determines the *Face A G*. Then for the Point F, at the interval F *G*, describe the *Arch I H*, and from the Point *G*, at the distance of 15 *Rods* describe *I L*, cutting the other in the Point *I*, which shall be the extremity of the *Curtain*, and of the *Line* of Defence *B I*; To trace the Circular *Flanks* and *Oreillons*, divide the *Flank G I*, into 3 equal parts, one of which is for the *Oreillon*, and the other two the length of the lower *Flank*. Let also *B N*, be ⅓ of the *Face B Z*, and draw *N O*, infinitely, by the Points *N* and *M*, on which take *M P*, of 2 *Rods*; then draw *I P*, with the distance *I P*; From the Points *P* and *I*, describe 2 *Arches* cutting one another in *Q*, which shall be the *Center* of the low and high Circular *Flanks*; let the *Interval* of them be a *Rod*; draw *R V*, *Parallel* to *M O*, and at the *Interval Q P*, or *Q I*, draw the *Arch R, S, I*; and having taken *S T*, of 5 *Rods* draw the *Arch V X*, make *X T*, 2 *Rods*;

to



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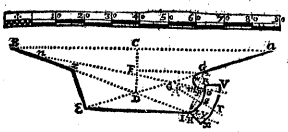
so you have traced the two Circular *Flanks*. For the *Oreillon* find the *Center W*, which is the half of *G M*, and describing the *Arch* of a *Circle*, at the distance *W M*, it comes to touch the Face prolonged in the Point 2.



Or the Construction may be more short thus: Having drawn as before the *Exterior Polygone*, the *Perpendicular*, and the two *Lines* of Defence, take for every one of 69 *Rods* 3 *Feet*; take for the *Face* 25 *Rods*, and having drawn the *Flanks* at the extremity of the *Lines* of Defence to the extremity of the *Face*, the rest you will find as before, or insensibly near.

The Method according to Count Pagen. Plate 1. Figure 3.

THis Author in his retirement after having been unfortunately Shot in the *Eye* at the Siege of *Arras*, wrote a great many good things on this Subject.

He takes a Method quite contrary to any that wrote before him; he works by the outward, or *Exterior Polygone*, and sets his *Flanks Perpendicularly* to the *Lines* of *Defence*; he divides Forts into *Royal*, *Mean*, and *small Royal*.

Royal, when the *Exterior Polygone* is 200 *Fathoms*, or 1200 *Feet*. *Mean*, when the *Exterior Polygone* is 180 *Fathoms*. And *small Royal*, when the *Exterior Polygone* is 160 *Fathoms*.

The Example shall be for a great Royal. The Construction is as followeth.

DIvide the *Exterior Polygone A A*, into two equal parts at *M*, each being 600 *Feet*; on *M*, raise a *Perpendicular M M*, take 180 Feet, or 30 *Fathoms*, and set it on the *Perpendicular* from *M* to *T*; then draw *A*, *T*, *C*, for the *Lines* of Defence, from *A*, set at *A F*, 60 *Fathoms*, or 360 *Feet*; from *f*, let fall a *Perpendicular* on the *Line* of Defence at *c*, or from *T*, set of 222 *Feet*; joyn *c c*, for the *Curtain*, upon the Points *a a*, set at the half of the *Angle* of the *Figure a o a*, as in the *Hexagone* 60 *Degrees*, that will determin the *Centero*; set of the *Gorge P C*, and the *Capital P a*, which you may Measure on the same *Scale* with the rest, and know the length of them in *Feet*.

For the *Mean Royal* work, as before; Take 30 *Fathoms*, or 180 *Feet* for *M F*, the *Perpendicular*, 55 *Fathoms* for the *Faces*, 32 *Fathoms* for *T c*, or 192 *Feet*; the *Flanks* will be found to be 24 *Fathoms*.

For the *small Royal*, Take 30, *Fathoms*, or 180 *Feet* for the *Perpendicular M T*; 50 *Fathoms*, or 300 *Feet* for the *Faces*, 27 *Fathoms* or 162 *Feet* for *T c*; the *Flanks* will be found to be 23 *Fathoms*, or 138 *Feet*, and are at right *Angles*, or 90 *Degrees* with the *Line* of Defence.

See Fortification de Pagen *printed at* Paris.

The Method of Monsieur * * * Plate 1. Figure 3.

HAving shewed the several ways, and *Rules* for laying the fundamental ground *Lines*, according to the most considerable *Engineers* of this last *Age*, I shall end this Chapter by giving an Account of the Method used by a famous *Engineer Monsieur* * * * in the building of several *Fortifications* beyond Seas, the which I suppose from the Advantages that attend it will commend it self.

You are to take the *Interior Polygone* of 720 *Feet*, or 60 *Rods*, (allowing 12 *Feet* to a *Rod*) according to the second *Maxim* the Point *Blank* that a *Musket* doth Execution; a fifth part of this you are to set off for the *Demi-Gorges*, which is 12 *Rods*, or 144 *Feet*; a sixth part to the *Flank*, *viz.* 10 *Rods* or 120 *Feet*; these two together, *viz.* 22 *Rods* or 264 *Feet* for the *Capital*, there remains 36 *Rods*, or 432 *Feet* for the *Curtain*. See the Figure.

The Reason why I give a $\frac{1}{5}$ part of the *Interior Polygone* to the *Demi-Gorge*, is; First, That the Line of Defence may never exceed the Port of a *Musquet*, which would happen, if I did but give a $\frac{1}{6}$ part. Secondly, The *Gorge* being too short, the Point of the *Bastion* would become too sharp, or the *Capital* too short, and by consequence the *Bastion* too little: This proportion is the best for the *Pentagone*, *Hexagone*, and *Heptagone*, because by these Figures we cannot have the *Flanks* greater, or the Defence better. But for the *Octogone*, 9, 10, 11, and 12 sided Figures, the following Method is much better. There is given to the *Face* 29 *Rods*, to the *Flanks* 12, and to the *Curtain* 36. The Point of the *Bastion* is 90 *Degrees*, then the other parts, *viz.* the *Demi-Gorge*, the *Capitals*, the *Polygone* interior and exterior are found by calculating and forming *Triangles*.

This Method for these *Figures* is much the better, because the *Flanks* become greater, and the *Angle* of the *Polygon* is greater, the *Gorges* become greater, the interior *Polygone* longer, and consequently a great deal of more Ground incloſed, than according to the first Method of Fortifying.

The *Flanks* ought to be perpendicular to the *Curtain*, or very near it, to the end the *Enemy* may not make *Batteries* afar off, but be obliged to make them to ruine the *Flanks* just under the *Besiegers* Fire, which will cost them much blood and pain; and the reason is evident: For in bringing them to fall perpendicular to the Line of *Defence*, the *Flanks* are too much exposed to the *Enemy*, and so discovered to the *Campaign*, that the *Enemy* finds all advantages imaginable to raise many *Batteries* afar off to batter and ruine the *Flanks* with their *Cannon*, which is an *Enemies* chief Design in a *Siege*, that they may the easier approach the *Town*, and pass the *Ditch*. That the design of the *Flanks* are chiefly to scour the *Ditch*

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Ditch and *Counterscarp*, to hinder the *Enemy* to pass their *Gallery*, and make a *Lodgement*, the which seems very reasonable, seeing the *Guns* from the Faces of the *Bastions* and *Curtain*, scours the *Campaign* more directly than the *Guns* from the *Flanks*; and 'tis found by the account of *Sieges* that an *Enemy* advanceth in a little time very securely in their *Trenches* to the *Counterscarp*; wherfore if the *Guns* be still mounted on the *Flanks*, to discover them at their breaking the *Stap*, and that one or two *Batteries* at most can be raised to dismount them, and that in so dangerous a *Post* too, to be under the *Besiegers Fire*, it is certainly an advantage not to be found when the *Flanks* fall perpendicular on the *Lines* of *Defence*.

CHAP. IV.

Of Out-Works, and their Uses.

AS it is a great advantage to a place to be surrounded with a good *Ditch*, and good *Rampert* and *Walls*; so likewise it is a considerable disadvantage when there is found low, or rising Ground near the *Counterscarp* of a *Town*, which may serve either for Lodgments to the *Besiegers*, to facilitate the carrying on their *Trenches*, or for Advantage-Ground, to raise *Batteries* against the *Town*. For this Reason, *Engineers* have invented divers sorts of Works for the remedying these Faults; as, to take in the disadvantageous Ground, to Elong the *Enemy*, and to hinder (by being low) their sudden Approaches by raising the *Campaign* almost with a *Horizontal Shot*, and spend their time before they advance to the main *Works*, and force them to gain these *Out-Works* with as great hazard and loss, as if they attempted the *Fort* it self; and after the *Out-Works* are lost, it may be a new Work to them to approach the *Town*.

There are several sorts of *Out-Works*, such as *Ravelins*, *Half-Moons*, or *Demi-Lines*, *Horn-works*, *Tenails*, and *Crown-works*; of which in order.

Of the Ravelins.

THere are two sorts of *Ravelins*; the one with *Flanks*, and the other without.

The *Ravelins* with *Flanks* are set before long *Curtains* when the two *Bastions* can't *Flank* one another with *Musquet-Shot*, and the *Curtain* not long enough to build a Plate *Bastion* on the middle of it. These *Ravelins* supply the effect of a *Bastion* not only to cover, but also to defend.

The making of these *Ravelins* is thus; cut the *Ditch* parallel with the *Curtain*, above which set up a *Capital* from 18 to 22 *Rods*, the *Demi-Gorges* from 10 to 12 *Rods*, the *Flanks* from 8 to 10 *Rods*, the *Ditch* round them, the largness of the *Flanks* going parallel with the *Face* of the *Ravelin*, till it meet the *Ditch* of the *Face* of the *Bastion* of the place, to the end the two *Flanks* of the *Ravelin* may scour over all the *Ditch* before the *Face* of the *Bastion*.

The other sort of *Ravelins* consist only of a *Capital*, and two *Faces* (as *Figure* 4, *Plate* 1. the *Ravelin* A.) the *Capital* from 12 to 18 *Rods*, the *Faces* are drawn towards the Shoulders of the *Bastions*, that the *Ravelin* may be commanded within not only by the *Curtain*, but also by the two *Flanks*.

This Work is oft-times by the *Souldiers* called a *Half-Moon*; the chief use of it is to cover the *Curtain*, *Bridge*, and *Gate*, and is very often used in most *Works*. The ordinary way of making them is thus,

Take with the *Compasses* the extension of the *Curtain B*, *Q*; from the Points *B* and *Q*, make two *Arches* crossing one another in *D*, the *Line* that passes through the middle of the *Curtain*; then from the Point *D*, draw *Lines* towards *E* and *F*, till they cut the *Counterscarp* in *G* and *H*. Joyning *G I*, and *H I*, you have the *Faces* and *Demi-Gorges*; the *Ditch* round this Work, as it is in all *Out-Works*, is half the breadth of the Great *Ditch*.

Because these *Ravelins* are weak, they may be made double, one within another, seeing the *Ditch* round them is narrow, and the *Profile* slight, and therefore soon Taken and Mined. The *Interior Ravelin* will serve for a good Retrenchment, being four *foot* higher than the other. But both are to be Mined, least the *Enemy* find too great advantage to make *Batteries*, and fill the *Ditch*. They are to be lower than the *Ramperts* of the *Town*, to be always exposed to the *Besieged Fire*, in case the *Enemy* make a *Lodgment* on them.

Of the Demi-Lunes, or Half-Moons. Plate 1. Fig. 4.

THe *Demi-Lune*, or *Half-Moon*, is a Work raised always before the Point of a *Bastion*, which is so called from the low Cavity of its *Gorge*.

The Construction is, by prolonging the two *Faces* of the *Bastions*; from the Point *O*, at the distance *O K*, make the *Arch K L*, where the *Faces* prolonged out the *Counterscarp*; raise the *Capital M N*, of $\frac{1}{3}$ of the Face of the *Bastion*; then drawing the *Faces* to the *Angle* of the *Counterscarp I*, till it cut the *Face* of the *Bastion* prolonged at *P*, so you have the *Flanks K P*, and the *Face N P*, which are to be set off on the other side from *N* to *Q*, and from *L* to *Q*; the *Ditch* is to be Parallel to the *Faces* of the same Breadth with that of the *Ravelin*.

This *Work* is no more in use, seeing their *Faces* have but a weak defence from the *Ravelin*, the *Enemy* may ruine them easily, and pass without any difficulty their *Ditches*, and so make themselves Masters thereof; and the *Faces* and *Flanks* of the *Demi-Lunes* will serve them for *Batteries* against the *Ravelin*, and the *Flanks* of the opposite *Bastions*. And although they may be Retrenched by *Traverses*, yet the *Enemy* will not fail to Attack the Face entirely, or the place where the last *Retrenchment* is. This happens to another Work, called a *Counter-guard*, which being likewise out of use, I shall not describe the *Figure* of them. *Vide* Plate 1. Fig. 4.

Of the Horn-Works. Plate 1. Fig. 9.

HOrn Works are to be set before the *Curtains*, in drawing *Lines* from it perpendicularly at the two *Flanks*, towards the *Campaign*, of 60 *Rods*; their *Front* is of 36 *Rods*, equal with the *Curtain*; this is to be divided into three parts, one for the *Curtain*, the other two for the *Demi-Gorges* of the *Horn-Work*; the *Flanks* of six *Rods*, or 72 *Feet* every one.

This *Work* is the principal of all the *Out-Works*, and its found by Experience, that an *Enemy* is kept back, and gains as little Ground as possible by this *Work*, rather than by any other; they extend themselves far into the *Campaign*, their *Fronts* defend themselves, the Interior of them is open to the *Town*, they may be often Retrench'd, and consequently fatigue and cozen the *Enemy*.

But this *Work* requires many *Men*; the *Flanks* and *Faces* of the *Demi-Bastions* are too little, and the *Rampert* too thin to plant *Cannon*, and to slay on when there is a Breach. Thus an *Enemy* may easily Mine the *Defences* on the Front, and by force Master the *Demi-Bastions*, and on this height make *Batteries* to ruine the *Retrenchments*.

For this Cause, these *Works* are only to be made when there is a great necessity, and in such places only where the *Enemy* is obliged to Attack the place.

To place *Ravelins* before this *Work*, observe only the Method in the first *Paragraph*.

Of the Tenails. Plate 1. Fig. 4.

THe *Tenails* (if there be not time to make a good *Fortification* for the defence of the *Bridge* and *Passages*) 'tis usual to raise in haste a *Parapet* in form of a *Tenail*, as Fig. 4. their Sides are no longer than the 50 *Rods*, their Front is of 36 *Rods*, which is to be divided into four parts; in the middle we draw a *Perpendicular*, on which is set of a $\frac{3}{4}$ part of the *Front*, towards the *Town*, and draw *Lines* from the Sides forming the *Faces*.

This *Work* is very proper for the *Counter Approaches*, when we would succour the place with *Men*; that which is the true Origen of so many *Horn-Works*, as well as *Tenails*, being first invented to this end, in the Sieges of *Bomel*, and *Bergen-op-Zoom*.

Having time, we make the *Tenails* stronger, and joyn them to *Horn-Works*, that the *Enemy* may be the better discovered at the *Angle* of the *Counterscarp*, and the *Work* better defended.

Of the Crown-Works. Plate 1. Fig. 4.

A *Crown-Work* is ordinarily made when a Height is so near a place, that the *Shot* of a *Musquet* reaches it; to this end we extend the Sides of this *Work* (whether the *Crown-Work* be before the *Curtain*, or *Bastion*) 65 *Rods*, the Point of the *Demi-Bastions* are to be at least 60 *Degrees*. Joyn the Extremities of the Sides; on the Middle raise a *Line* perpendicular, on which set 18 *Rods* for the *Capital*, making an *Angle*, and two *Interior Polygons*, every one of about 50 *Rods*, giving 10 to the *Demi-Gorges*, and 8 to the *Flanks*. We make *Ravelins* to this *Work*, as is taught in the first *Paragraph*.

This *Work* may serve to adjoyn to *Forts*, that are too little to Lodge a great *Garrison*, which oftentimes happens when small Places, or *Towns* of no great Consequence, become great *Frontiers*, when it would cost too much to enlarge the whole *Fortress* round by making of a new *Wall*: And it would not be so convenient to throw down the old *Work*, which a small *Garrison* (if need were) could maintain.

All the *Out-Works* ought to be detached from the place, and environed all round with a *Ditch*, having their Communication by *Bridges*; or if the *Foss*, or *Ditch*, be dry by Land, yet not joyned with the *Counterscarp*, lest the *Enemy* invest them behind.

All these *Out-Works* (with many more) are represented in the *Figure* on the *second Plate*.

Of Cittadels and Castles.

CIttadels, and *Castles*, are built to Command and Bridle a *Town*, in case the *Burgers* should be Rebellious, and to be the last Refuge or Retreit. They are commonly of four or five *Bastions*, and are used when a *Town* is so great, that the *Garrison* makes in Number but a $\frac{1}{5}$ or $\frac{1}{6}$ part of the *Burgers*; although sometimes they are used as *Blinds*, built on any Hill, or Rising-Ground near a *Town*, from hindring an *Enemy* from Shooting into it. They are set so, that there may be two *Faces*, and a *Curtain* towards the *Town*.

The *Pentagon* is the most advantageous *Figure* to make a good *Cittadel*, which opposes three *Bastions* to the *Enemy*, and two to the *Town*, Commanding at the same time both the *Campaign* and the *Town*.

The *Interior Polygon* of the *Pentagon* may be made of $\frac{1}{4}$ of the adjoyning *Curtain*, or a little more; the two *Ports*, or *Gates* of the *Cittadel* are placed, that one may be towards the *Campaign*, the other towards the *Town*, every one covered by a *Ravelin*.

If the *Cittadel*, or *Castle*, be a square, or 9 sided *Figure*, then the *Center* of it may be on the Point of the *Interior Polygon* of the place.

The Center of the *Pentagon*, or 5 sided *Figure*, may be near on the Point of the *Bastion* of the *Town*, taken away to make the *Cittadel* in, although some use them at a greater distance.

The *Gorges*, *Flanks*, and *Capitals* are set off in proportion to their *Interior Polygons*; the *Ramperts* are to be as high as those of the *Town*.

For a more particular description of the *Out-Works*, consult *Travaux de Mars*.

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CHAP. V.

Of the Ramperts and Parapets; Walls, Cazemats, and Orillons; Fauſſebray, Ditch, or Moat, and Covered Way.

Of the Ramperts, *and* Parapets.

THe *Rampert* is a great and thick Maſſy-Bank of *Earth*, raiſed round about the *Fort*, Incloſing it to reſiſt the *Enemies* Great Shot, and to ſave the Buildings of the *Town* from ruine; and by their Height, the better to annoy the *Enemy* in their Approaches: And therefore ought always to be ſo high, that they may Command with the *Artillery* planted on them, the *Campaign* all round, and that the *Enemy* may not Command them by raiſing the *Batteries* higher.

But to this end, you muſt take notice of the *Meaſure*, and make the *Ramperts* never higher than 20 Feet without the *Parapet*, that it may Command the better the *Covered Way*, and *Ditch*, and not by too great height give opportunity to the *Enemy* to be under *Covert*. And on the contrary, the *Rampert* ought not to be leſs than 12 Feet without the *Parapet*, otherwiſe the *Enemy* will Command it eaſily by their *Batteries*.

The Thickneſs ought to be ſo regulated, that the *Parapets* builded on them may be ſtrong enough to reſiſt the Violence of the *Enemies Cannon*; and that behind them there may be place enough to plant Great *Guns*.

But as the *Earth* is not always the ſame, you are to conſider what the Nature of it is. If the *Earth* be Tough and Clayiſh, a *Bullet* of 24 *lib.* will enter no farther than 10 Feet; but if the *Earth* be Light, and Looſe, or Sandy, then a *Bullet* of the ſame weight will enter 15 Feet, or more. Therefore the *Parapet* muſt be made from 16 to 24 Feet, chiefly in the *Flanks*, and other places where there are made *Counter-Batteries*.

The Interior height of the *Parapet* is 6 Feet, the Exterior 4 Feet; the *Baſe* of the Interior *Talii*, or *Slope*, 7 Feet, the Exterior *Talii* 2 Feet; the *Banquet*, or *Foot-Bank*, 3 Feet broad, and a Foot and an half in height.

The largeneſs of the *Terraplane* of the *Rampert*, is always proportioned to the Length, and Recoyling of the *Cannon*. Since then, that a *Demi-Cannon*, or a *Culverin*, are about 15 Feet long, and they Recoil about 6, 7, 8, or 9 Feet; and there being place neceſſary to manage them, the *Terraplane* ought to be at leaſt from 32 to 40 or 50 Feet large.

This Largeneſs ought to be ſet all round a place, and the *Baſtions* ought to be entirely filled, if it could conveniently be done; but ſo, that the *Talii*, or *Slope* towards the *Town* may be proper to aſcend with the *Cavalry* (as it is in the *Cittadel* of *Antwerp*.) In ſuch *Baſtions* you may more eaſily Rencounter and diſcover the *Enemies Mines*; and they ought to this end be Vaulted, either in Building; or if that be neglected, in time of a *Siege*.

The *Interior Talii* of the *Rampert* is equal to the height of it, that is, a Foot for a Foot; the *Exterior Talii*, or *Slope*, is the half of the height, if the *Earth* be good; otherwiſe ⅓. The *Baſe* of the *Rampert* is found by adding to the *Terraplane*, the *Banquet*, *Parapet*, and two *Talii*'s.

It were very convenient (if there were *Earth* enough) to make the *Ramperts* larger, and Vault them under with *Entries* towards the *Town*, to be places of Refuge for the *Citizens*, to be ſafe from the *Enemies Bombs*, which do great Execution in their *Houſes*. To this end, as the *Grave* in *Holland*, having *Earth* enough, by reaſon of their enlarging the *Fortifications* of the *Town*, they do intend to improve it to this Advantage.

But the Solidity and Dimenſions of the *Rampert*, muſt have their determinations from the Judgment of the *Engineer*, according as the Ground may prove; and from the *Purſe* of the *Prince*, according as there is *Money* enough to finiſh withal. Therefore I have given the higheſt Meaſure that is to be uſed in ſome of the *Works*, and the leaſt in others; from which you may proportion any mean Meaſure, according as the *Ground* and *Money* gives leave.

If it were the Cuſtom now to agree with *Engineers*, as *Princes* and *States* did not many Years agon, in the Building the *Fortifications* of their *Towns*, to treat with them according to ſuch and ſuch a Deſign, as propoſed to them, to render the *Town* defenſible in a limited Time; and it is to be their buſineſs to provide *Earth*, *Stone*, *Inſtruments*, and all *Materials* neceſſary to the carrying on and compleating the *Works*; by this means the *Engineer* was obliged to calculate the Thickneſs and Solidity of the *Ramperts*, to the end he might know exactly how much *Earth*, *Stones*, and other *Materials* he muſt have; how much he muſt dig and enlarge the *Ditch*; and conſequently be able to tell in what Time, and for how much *Money* he could raiſe and compleat the *Work*. If this were the Cuſtom, it would not be impertinent to ſhew how to build up a *Fort*, and make an eſtimate of the *Coſts* and *Moneys* required to perform the ſame; although it were a very hard Task to perform exactly: For there being ſuch a variety in the Body, or Maſs, whereon the *Fort* is to be built, as either *Brick*, or *Stone*, Solid ſtrong *Earth*, or *Mooriſh*, or *Marſhy Ground*, where there will be a prodigious Expence in Pilating the Foundations of the *Ramperts*, the neglect of which has made very fine and fair Deſigns tumble into the *Ditch*. Upon this Account *Princes* take another Method; they have particular *Engineers*, and *Intendants*, of which the one gives the Deſign, and pays the *Work-men*, and the other furniſhes the *Stones*, and other *Materials*, and to keep the *Work-men* at their *Work*, overſeeing them.

In a word, This Buſineſs paſſes through ſo many Hands, that it is difficult to know how much the *Work* will coſt to raiſe it Compleat, unleſs all the Accounts be gathered into one, which cannot be done till after the *Works* are finiſhed.

In *Plate* 1. *Fig.* 5. you have the Dimenſions and Meaſures of the *Rampert* and *Parapets*, and is as followeth in the *Profile*, cut at right *Angle* through the Face of a *Baſtion*.

	Feet.
R,A, The *Baſe* of the *Rampert*, is	80
T,S, or *Q,O*, The Height of the *Rampert*, is	20
F,S, The Interior *Talii*, or *Slope*,	20
O,A, The Exterior *Talii*	04 ½
L,Q, The *Baſe* of the *Parapet*	21
Z,D, The Interior Height of the *Parapet*	06
N,P, The Exterior Height	04
N,Q, The Exterior *Talii* of the *Parapet*	02
Q,D, The Interior *Talii*	01 ½
V,Q, The Breadth of the *Banquet*, or *Foot-Bank*	03
V,X, The Height of the *Foot-Bank*	01 ½
I,V, The Largeneſs of the *Terraplane*	35

The *Profile* of the reſt of the Works will be found in their particular *Paragraphs*.

To give *Rules*, to caſt up and find the ſolid Content in *Feet*, and *Rods*, of the *Rampert* and *Parapet*, were to repeat what I ſuppoſe is handled in the Treatiſe of *Geometry*; and I do not find the great uſe of this Curioſity to be particular in applying the *Rules* to this purpoſe: For I do think, that if there be not *Earth* enough had out of the juſt Deepneſs and Wideneſs of the *Ditch*, it will do no great hurt to make either the *Ditch* Deeper, or Wider; and if there cannot be had enough, but by altering too much the Proportion, or the Ground not giving leave, it may be had ſomewhere elſe near the *Town*; and ſeeing *Work-men* are to be paid by *Day Wages*, if the *Overſeers* do their Duty right, the *Prince* is not at all Cheated, although he knows not how many *Baskets* full of *Earth* the *Works* contain, yet not to let this altogether paſs.

Note, That the *Earth*, or *Solidity* that lyes between *T, Q*, and *S, O*, is a *Parallelipipedon*, all of one height and thickneſs, and the Content of it is found by Multiplying the *Superficies* at the Bottom, by the height of the *Rampert*. The *Earth* that lyes on either ſide of this Body, and has each *Talum* for its *Baſe*, and ends at the Top of the *Rampert* in a *Line*, are *Priſmes*, or half of *Parallelipipedons*, as *o, a, c*, and *S, R, T*, and their Solid content is found by Multiplying the *Superficies* at the Bottom, by half the height.

There is found in caſting up the *Solidity* of the *Ramperts*, two ſorts of *Pyramids*, *viz.* erect *Pyramids*, and their *Solidity* is had by Multiplying the *Baſe* into ⅓ of the height, thoſe ly to the outſide of the *Rampert*, and have one or two Sides to be ſeen.

The ſecond ſorts are *Pyramids* jacent, and their *Solidity* is found by Multiplying the Superficial content of the *Baſe*, by ⅓ of the height; theſe ly with all their Sides hidden in their *Rampert*; all the *Sums* added together, give the ſolid content of the *Rampert*. For the *Parapet* and *Banquet*, you are to follow the ſame *Rules*.

Of the Walls.

THe *Ramperts* that are revetued, or *Faces* with *Stone* or *Brick*, are the beſt both againſt *Scaling* and *Mining*, and are very uſeful to ſuſtain the *Ramperts* from tumbling into the *Ditch*, by the badneſs of the Weather.

Engineers have made a conſiderable improvement in the form of erecting the *Walls*, which certainly muſt turn to a conſiderable Account. Inſtead of Building the *Walls*, as before, *Perpendicular* towards the *Town*, now they bring them up with ſuch a Slope as they give to the *Walls* without, which both ſaves about a ⅓ or ½ part of *Stone* or *Brick*, that muſt be uſed; and the *Earth* of the *Ramperts* behind them lying almoſt in it its natural Poſition, doth not preſs the *Wall* ſo much forward into the *Ditch*, as when the *Walls* are brought up *Perpendicular*, as is clear in *Figure* 6. *Plate* 1.

This they put in uſe at the *Grave*, where they find it turns to good Account; and I am ſure, that if what was before built of the *Town* had been after this Method, the *State* had not been put to double Expences.

The *Walls* of the *Baſtions* are to be built higher than the *Walls* of the *Curtain*, which may be only about 12 *Feet* in *Perpendicular* height, and 3 *Feet* for the Slope, their *Counter-forts* may be about 14 or 15 *Feet* in length, 3 *Feet* in thickneſs, and 12 *Feet* Diſtant one from the other. But the *Walls* of the *Baſtions*, may be erected ſo high as in the *Figure*, 22 *Feet* in *Perpendicular* height, 4 ½ for the Slope, 6 *Feet* thick at Top and Bottom, the *Counter-forts* 16 *Feet* long, thick at the *Wall* 5 or 6 *Foot*, 12 *Foot* of diſtance, or leſs, according as the Ground or Foundation proves.

If the Ground be *Mooriſh* or *Marſhy*, then the Foundation of the *Walls* muſt be *Piloted*, and the *Piles* drove ſo deep, that a 16 or 20 hand Bill-bettle will not drive at laſt above a quarter of an *Inch*, when then the *Piles* will touch the firm Ground. The *Piles* are to be ſet at greater or leſſer diſtance according as the Foundation is, and are ordinarily of about 10 *Inches Square*. Over theſe *Piles* there muſt be ſtrong *Timbers* layed, and Croſs theſe there muſt be others of the ſame thickneſs, notched into one another, ſo thick as the ſeat of the *Wall* is; at the inſide thereof is layed a *Timber* of 6 *Inches Square*, or there abouts, and at the forepart of the *Wall*, there is another of a *Foot Square* layed over the Croſs *Timbers*, and Notches into them to Prop the Foot of the *Wall*; betwixt this *Timber* and the *Wall*, there are *Planks* of 4 *Inches* thick joyned together and driven into the Ground juſt with the *Slope* of the *Wall*, to hinder the Water of the *Ditch*, from waſhing out the *Lime* from the *Walls*, or the *Earth* under the *Timbers*, betwixt the *two Square Timber* above the Croſs ones; there are to be *Planks* layed of 3 *Inches* thick, on which the *Wall* is to be erected. The *Earth* betwixt the *Counter-forts* is to be well rammed and beaten.

If there be no *Fauſſebray* before the *Faces* of the *Baſtions*, there ought to be made a *Vault* or *Alley* of 3 *Foot* large, 6 *Foot* high, with ſmall *Windows* to ſhoot into the *Galleries*.

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A (in *Figure 7. Plate 1.*) is the Figure of the Instrument the Workmen apply to the *Walls*, to bring up the *Slope* true, by the *Plumets* playing down exactly upon the *Line*.

Of Cazemats, and Orillons.

Cazemats are several *Platforms* for *Guns* to be made in the Corner of the *Flanks*, to be hid conveniently from the *Enemies Batteries*, and to be preserved, if possible, against the *Enemy* shall begin to lay their *Gallery*, and pass over the *Ditch*, or to plant their *Guns*, and raise *Batteries* on the *Counterscarp*.

To this end there are *Orillons* set on the *Flanks*, of $\frac{1}{3}$ or $\frac{1}{2}$ of the *Flank* to keep at least two *Cannon* under Covert, and are made either of a a round Figure, or *Square, as are to be seen on the* Flanks *of several of the* Bastions *of the* Figure *on the second* Plate. For the Construction of these *Figures* consult *Travaux de Mars*.

Engineers of late do find fault with these *Orillons* since they ought necessarly to be revetued with a *Wall*. If the *Enemy* do play with their *Cannon*, no body will be able to stand in the *Cazemats*, by reason of the broken Wall flying, and they find that the *Orillons* do hinder from defending from within the *Ravelins*, and for these reasons they do not commend the use of them.

In *Flanks* that are not *Perpendicular* to the *Curtain*; and consequently too open to the *Besiegers Batteries*, these *Orillons* supply the fault, of their being too open, which I suppose has been the reason why some *Authors* seem so positive for them; but where the construction of the *Flanks* is *perpendicular* to the *Curtain*, they do not appear to be needful, seeing the *Embrassures* of the *Parapets* cover enough.

Of the Fausse-bray.

AT the Foot of the *Rampert Engineers* make a *Fausse-bray* all round a place, but especially before the *Faces* of the *Bastions*; they are large, from 18 to 24 Feet of a *Terraplane*, with a *Paraper*, as that of the *Rampert*; of late they have neglected to make *Fausse-brays* alledging for reasons,

1. Since the *Fausse-bray* is but a *Parapet* raised above the Level of the *Campaign*, the *Enemy* being advanced to, and possessed of the *Counterscarp*, which is ordinarily of the same height, it may ensile it with their *Batteries* so easily, that it were impossible for the *Besieged* to stay thereon, and hinder that the *Enemy* might not pass the *Ditch*.

2. That the *Ditch* being passed, the *Miners* find place to *Mine* the *Faces* of the *Bastions* where they will, and in many Places at a time, and the *Mine* being made, the *Besiegers* may not only make the *Assault* at the *Breach*, but also on the Right and Left, in the *Fausse-bray*, and *Attack* over all.

3. And that which is the greatest reason, that the quantity of *Bombs*, which are at present Shot, the *Fausse-bray* will in few Hours be Totally ruined.

But in considering the great Advantages the *Fausse-bray* gives to a place, since from them the escape which the *Enemy* is obliged to make through the *Covered Way* is easily discovered, and the *Enemy* not only annoyed on the side, but likwise on the *Front*, and so hindered by *Musquet-Shot*, *Granadoes*, and *Artificial Fire* to fill the *Ditch*, and make a *Gallery*; and seeing also they defend the *Ravelins*, and *Covered Way*, much better than an high *Rampert*, it is more reasonable to remedy the Faults, than to reject the use of the *Fausse-bray* before the *Faces* of the *Bastions*.

As to the first Reason, *viz.* the *Enfilement* that the *Enemy* may make, the *Fausse-bray* may be made 9 Feet higher than the *Parapet* of the *Covered Way*.

The second, and third Faults may be remedied by *Traverses*, *Caponiers*, with little *Palisadoes* and *Countermines*; the rest of the Faults are remedied by making a small *Ditch* of 20 Feet between the *Rampert* of the *Town*, and the *Fausse-bray*.

When the *Ditch*, or *Moat* is dry, then the *Fausse-bray* is not found so convenient, as when it is full of *Water*.

See (concerning the Advantage of the *Fausse-bray*) *Chap.2. Lib.1. Dogen*, and *Chap.28. Lib.1. de Ville*.

Of the Ditch, or Moat.

THE *Ditch* or *Moat* is to be made so that the *Flanks* may command and scour it before the *Faces* of the *Bastions*; to this end the *Ditch* before the *Faces* is so broad as the *Flanks* are long, by drawing it towards the Shoulders of the opposite *Bastions*.

A wet *Ditch* ought to be so deep, that in the Summer there be no less than 6 Foot of *Water* in it.

The dry *Moats* may be deep from 20 to 30 Feet; and the *Moats* that are deep, and tolerable large, are esteemed better than such as are less deep and larger, to render the getting up the more difficult to the *Enemy*; although the *Moat* should never be less than *6 Rods*, or *72 Feet*; otherwise there cannot be made *Retrenchments*, and other Works in it; and the *Enemy* by *firing* a *Mine* at the *Counterscarp*, may cover and render all unprofitable. In the middle of the *Ditch* there is a *Cunet*, or *Canal*, made of 20 or 24 Feet *Broad*, which serves in dry *Moats* to *Countermine*, and to cause greater Pains to the *Enemy* to fill it.

The *Ditches* full of *Water*, are much better than the Dry ones; because these require too great a *Garrison* to defend them. For when the *Enemy* is once Master of the *Counterscarp*, he may render himself Master of the whole *Ditch*, and Attack in different places, in such a manner, that the *Besieged* will be obliged to furnish all their *Posts*, and to have them ready over all. The dry *Ditches* are likewise too much expoſed to *Surprize* and *Scaling*; when (on the other hand) the Wet *Ditch* costs the *Enemy* much Pains and Time before they can fill it, and the *Besieged* see where they are to pass and *Mine*; and therefore has need only

only to take notice of that *Post*, and at the rest to keep little *Corps des Guards*, and *Sentinels*.

See *De Ville's Ingenieur parfaite* on this Subject.

Of the Covered Way, and Counterscarp.

BEyond the *Ditch*, towards the *Campaign*, there is a large place of 20 or 30 *Feet*, covered with a *Parapet*, parallel with the *Ditch*, and sometimes made with salient *Angles* in form of *Ravelins*; and if there be a *Ravelin*, then they are made on both sides thereof.

The *Covered Way* is to Flank, and defend the *Campaign Horizontally* to hinder the *Enemies* approach, that it may cost them some pains and time before they become Masters of the *Counterscarp*, and *Ditch*; the *Besieged* have their place of *Arms*, to make Assaults, and their Retreits in case they be beat back. The Interior height of this *Parapet* is 6 Foot, and it falls sloping 50 Feet, or there abouts, till it lose it self in the *Campaign*. This sloping is called *Glassis*, or *Esplanade*.

This *Parapet* is ordinarily set on the *Level* of the *Campaign*; but seeing this height gives too great an advantage to the *Enemy* when he once becomes Master of it, therefore its better to take away 3 Feet from the height of the *Covered Way*, and set the *Parapet* so that it may be elevated no more than 3 Feet above the Level of the *Campaign*.

This is that part of the *Fortifications* of a *Town* that the *Souldiers* do commonly call the *Counterscarp*; although Properly the *Counterscarp* is the *Talis* or *Slope* of the *Covered Way* next the *Ditch*, whose *Base* is equal to the depth of the *Ditch*, if it be not *revetued*, or Lined with *Stone*, or *Brick*.

CHAP. VI.

Of the Representation of Figures, *and the Plat of any Fortified Town upon Paper, by way of Perspective.*

FOr describing of *Forts* and *Towns* there is a kind of *Perspective*, called by *Engineers*, *Perspective Cavalier*, that imagines the *Eye* at an infinite distance, that is, at such a distance that all equal heights in the *Fort* are seen under one *Angle*, whether further or nearer, and all other heights proportionable, and all *Lines* which would meet at the *Eye* are parallel; because of the distance; as we say the Rays of the *Sun* falling upon a *Burning-Glass* are parallel.

The other kind of *Perspective*, that designs by a principal Point, from whence all *Parallels* to that Principal do meet in that Point, being a very troublesom way, and does so confuse the Body of the Work, that unless one be very expert that way, he is not able to know what it means; although the Compleat *Engineer* ought to be skilled therein, as to represent a Body near at hand, or some *Engine*.

Draw the *Lines* of your *Fort* with White-Lines, or with any thing that will rub out, with all the *Parapets*, *Ramperts*, and *Out-Works*; then considering what Side you design towards you; whether the *Curtain*, or Point of the *Bastion*, or what other Point, draw a long *Horizontal Line A, B*, (*Fig.8. Plate 1.*) having a Square of *Brass*, or *Wood*, run one side of it along the *Line A, B*, and at the extream Points of the *Bastions*, *Flanks*, and *Shoulders*, draw *Perpendiculars* towards the *Line A, B*, over all, omitting those that will cut the *Ramperts*; or *Parapets*; because we cannot represent the Interior height of the *Rampert O*, which is hid by the Exterior height, *P*; the Interior heights *C, F, D, G*, and *E, H*, of the *Rampert* are represented by setting on the Perpendiculars, $\frac{1}{3}$ of the *Flanks* of the *Fort*, and joyning the *Lines F, G, H*, parallel to *C, D*, and *E*. For the height of the *Walls*, take what height you please; as suppose the $\frac{1}{3}$ of the *Flank*, and set it on all the *Perpendiculars*, from all the *Faces*, *Flanks*, and *Angles*, and joyn them with Parallels to the *Faces*, *Flanks*, and *Curtains*, and finish all, as you see in the *Figure* of a *Nonagone* compleated.

The *Angles* that fall within the Body of a place, cannot serve to represent the Exterior Elevation of the *Bastions*; because the Exterior is hid by the Interior height of the *Rampert* and *Parapet*, as the height *Z, T, X, V, T, R, Q, P*, on the *Perpendiculars* that fall from the *Angles* of the *Counterscarp* in the *Ditch*; set off $\frac{1}{3}$ of the *Flank*, to represent the depth of the *Ditch*. And Note, That *Lines* drawn from the *Angles* of the *Counterscarp* that do not fall into the *Ditch*, cannot represent the deepness of it.

The *Out-Works* are represented after the same manner; only observe, that the *Works* next to the *Town* ought to be represented higher.

The *Talis*, or *Slope* of the *Walls*, may be set off from the *Perpendiculars*, that the *Fort* may be the more naturally represented.

Note, That in giving the Shadows to a *Work*, all Opaque, and Bodies not transparent, cast their *Shadows* always oppoſite to the side from whence the Day, or Light comes; or towards the Right-hand generally, when we design any thing on *Paper*.

CHAP. VII.

Of Irregular Fortification.

FRom Regular proceeds Irregular *Fortification*, or the fortifying such *Figures* as have not their *Sides* and *Angles* equal one to another; as

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the Forms of *Towns* to be fortified commonly are, by reason of the Irregularity of their Form, and Situations; and therefore are the harder to be fortified the more they differ from Regular, which is the perfectest. And because it hapneth but seldom, that a *Regular Fortification* is newly raised, unless it be some small *Field Forts*, or *Citadels*; by reason that every one is inclinable to preserve his own; therefore Irregular *Fortification* is more in use, and consequently necessary to be exactly studied and known.

The same *Laws* and *Maxims* for *Regular Fortification* stand, and are in force in the *Irregular*, and serve for general Instructions, as occasion requires, to fortifie any place; and although they are not always to be precisely followed (for Time, Place, and Charge, may hinder) yet they ought to be observed as near as possible.

The greatest Art that is in *Irregular Fortification* consists chiefly in rectifying the Sides of any *Polygone* that are too short, or too long; and in altering the *Angles* that are too little or too great, by either going inward or outward of the place to augment or lessen the *Lines* to such a Proportion, as that they may be capable to receive a strong defenceable *Bastion*, (that is, a *Bastion* according to the *Maxims*). The *Angle* of a *Polygone* less than 90 *Degrees* is not fit to set a *Bastion* on, because then the Point of the *Bastion* will become too sharp, the *Flanks* too short, and the *Faces* too long.

But before any Judgment can be made, it is requisite that there be made a *Map* or *Plat* of the whole, with all the *Ways*, *Passages*, old *Walls* (if there be any *Rivers*, *Pools*, *Enclosures*) and all other things fit to be known in the *Draught*; and then there is to be designed what *Works* shall be thought most agreeing to the Place to be *fortified*; and according to the proportion of the *Draught* on *Paper*, the same is to be set and raised on the Ground round the *Town*.

A Polygone, less than 45 *Rods*, is incapable to place a *Royal Bastion* on. And a *Polygone* longer than 65 *Rods*, is also too long; in such cases the *Angle* is either to be made greater, the short *Lines* longer, or the long *Lines* shorter, to the just proportion.

If therefore there be a *Polygone* of 50 *Rods*, and another of 60 *Rods*, then according to the fifth *Paragraph* of the Third *Chapter*, take $\frac{4}{5}$ of 50 the Interior *Polygone* for the *Gorge*, $\frac{1}{2}$ for the *Flanks*, and both these together for the *Capital*. Thus for a *Polygone* of 50 *Rods*, there is 10 *Rods* for the *Gorge*, 8 *Rods* 3 *Feet* for the *Flanks*, and 18 *Rods* 3 *Feet* for the *Capital*. For a *Polygone* of 60 *Rods*, there is by the same Rule 12 *Rods* for the *Gorge*, 10 for the *Flanks*, and 22 *Rods* for the *Capitals*.

Therefore divide the *Angle* of the *Polygone* into two equal parts, through the middle draw a *Line*, on which set the *Capitals*, the one of 18 *Rods* 3 *Feet*, the other of 22 *Rods*; then draw from the *Flanks* of 10 *Rods* towards the *Capital* of 22 *Rods*, and so from the other *Flank* by his *Capital*, till you meet the *Face* of the other, and so you have an Irregular *Bastion*.

Thus by considering the Overture or opening of the *Angles*, and the length of the Sides, you may fortifie any *Figure* in proportion, observing always the *Rules* and *Maxims*. As,

Suppose you find the *Angle* of a *Polygone* of 120 *Degrees*, consider to which in *Regular Fortification* it comes nearest; as in this Example, To a 12 Sided *Figure*, or *Dodecagone*; then according to the *Rule* of *Proportion*, If the *Polygone* of a 12 sided *Figure* of 64 *Rods* give the *Demi-gorge* of 14 *Rods*, the *Flanks* 12 *Rods*, and the *Capital* 24 *Rods*, 6 *Feet*, or $\frac{1}{4}$ a *Rod*; how much will a *Polygone* of 50 *Rods*, and how much will a *Polygone* of 60 *Rods* give?

If a *Line* be very long, then it is to be fortified with a *Plat Bastion* in the middle of it, the proportion is a great *Royal*.

A Polygone of 133 *Rods*, may be *fortified* after this manner:

If it be less, *viz.* from 90 *Rods* to 130, then it is to be *fortified* according to the *Rule* of *Proportion*; if it be shorter than 90 *Rods*, the *Plat Bastion* will be too little, and therefore it is better to set on the two *Angles* of the *Polygone* two great *Royal Bastions*, and in the middle a *Ravelin* with *Flanks*.

The *Angle* of a *Bastion* less than 90 *Degrees*, is not well *fortified* with *Demi-Bastions*, seeing the *Face* is much exposed to the Fire of the *Besiegers Batteries*, and the *Point* too sharp; therefore the *Angle* is to be made greater, or if the place will permit, to Retrench it in Form of an *Horn-Work*.

Seeing there is so much variety in *Irregular Fortification*, the young *Engineer* must practice by himself, by drawing several *Plats* of Irregular Places, and *fortifying* them; and because Examples in this matter (as in other things) exceeds all *Precepts*, he may perufe the best *Books* he can find on this Subject, as *Maralois*, *Dogen*, and several others, where he will find infinite Cases and Examples, that will help him, and inform his Judgment for effecting his desire.

The raising the *Ramperts* and *Parapets* are the same as in *Regular Fortification*; and all or any of the before-mentioned *Out-Works*, may be placed before the *Curtains*, and made in proportion to them as occasion requires.

CHAP. VIII.

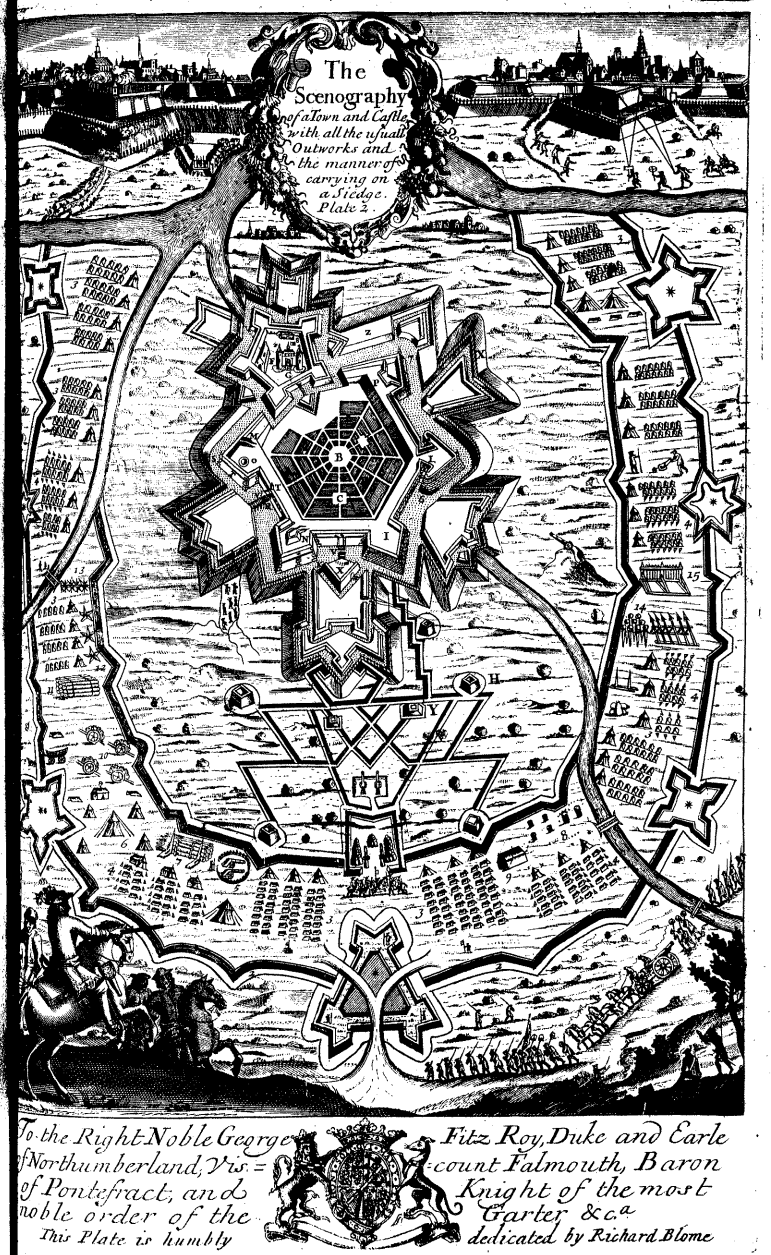
The Explication of the Second Plate.

A, is a *Town* environed with a *Wall* and *Moat*, which serves to cover and defend the Houses from the violence of the *Enemy*.

B, is the place of *Armis* where the main Guard is kept; or the place where the *Souldiers* of the Garison assemble at the time of Mounting the Guard, to know their *Posts*.

C, are the *Market Places*.

D, and


The Scenography of a Town and Castle, with all the usuall Outworks and the manner of carrying on a Sledge. Plate 2.
To the Right Noble George Fitz Roy, Duke and Earle of Northumberland, Vis.-count Falmouth, Baron of Pontefract, and Knight of the most noble order of the Garter &c.a
This Plate is humbly dedicated by Richard Blome

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D, and *E*, are the Houſes, by which is meant not only private, but publick Houſes, as *Halls*, *Priſons*, *Churches* &c.

I, is a *Baſtion* or *Bulwork*.

L, are the *Cazemats*.

6, is an *Orillon*.

P, is a *Retrenchment*, or a Work the Beſieged make behind the place attacqued, to keep the *Enemy* the longer off from being Maſters of the *Town*.

7, are *Fraiſes*, or ſeveral pieces of Wood fixed in the *Wall* under the *Cordon* or upper Row of *Stone* or *Brick* in a *Wall*. In places that the *Ramperts* are not *revetued*, or lined with *Stone*, they are placed always at the Foot of the *Parapet*; their uſe is, to hinder Deſertion and Surprizes by *Scaling*.

M, is a *Platform*, or *Earth* thrown up along the *Curtain*, which ſerves to plant Great *Guns* on.

N, is a *Cavaleer*, or a height ſometimes of *Earth*, *Stone*, or *Brick*, raiſed in the middle of a *Baſtion*, to plant ſome Pieces of *Cannon* on, to ſcour the *Campaign* to oblige the *Enemy* to begin their *Trenches* at a great diſtance from the *Fort*, and to make them the deeper.

O, is a *Countermine*, or ſort of a *Well* the beſieged dig or make in their *Ramperts*; towards the bottom of them they make ſeveral little Allies branching under Ground, to diſcover the *Enemies Mines*, and to give Vent to them when made and ſprung.

S, is a *Guerit*, which covers the *Centinel* from the Weather.

V, is a Port, with a *Stone-Bridge*. The *Wooden Bridges* are eſteemed the beſt, becauſe as occaſion requires they may be burnt down eaſily.

R, is a *Draw-Bridge*.

F, is a *Cittadel*.

G, is the *Caſtle* or *Governours* Lodging environed with a *Moat*; there is ordinarily on top of it a *Tower*, which diſcovers a great way into the *Campaign*, on which there is a *Bell* to ſound *Alarum* or *Retreat*, as there is occaſion.

Z, is the *Covered Way*, or that which the *Souldiers* ordinarily call the *Counterſcarp*.

X, is the *Glaſſis*, or *Eſplanade*.

Y, are the *Trenches* in which the *Enemy* under *Covert* approach the *Fort*.

H, are *Batteries* raiſed at every turning of the *Trenches*, to diſmount the *Beſiegers Cannon*, and ruine their *Walls*.

1, is the *Line* of *Contravallation* to ſecure the *Camp* from Surprizes from the *Town*, by frequent Sallies, that the *Beſieged* might make.

2, is the *Line* of *Circumvallation*, which is to hinder any Succor or Aſſiſtance to get into the *Town*, and to hinder the *Souldiers* deſertion.

*, are *Redoubts*, *Triangles*, *Squares*, and other *Field-Works* upon the *Line*, to *Flank* and Defend it.

3, is the *Ground* and *Tents* of the *Infantry*.

4, are the *Cavalries*, *Huts* and *Tents*.

5, is the *Artillery* part, where the *Cannon*, and all *Tools* (and things neceſſary for Service) are kept.

7, are *Bruſhes*, and Faggots, or Facines, which ſerve both to make *Parapets* of, and to fill the *Ditch*.

8, are *Baskets* full of *Earth*, which ſerve for *Parapets*, through which the *Muſquetteers Shoot*.

9, is a *Gallery*, or a Frame of *Wood*, which ſerves to cover the *Miners* in paſſing the *Ditch*, or *Moat*.

10, is the Quarters for the *Victuals*.

11, are big Pieces of *Wood* to mend the Ways, to facilitate the Paſſage of the *Artillery*.

12, are *Crow-foots*, *Calthrops*, or Four-pointed *Irons*, one Point being always uppermoſt, to ſtrow on the Ground to hinder the *Cavalry* to paſs, gauling or pricking their Feet.

13, *Horſe de Freeſe*, is uſed inſtead of a *Gate*; it is ſometimes called a *Turn-Pike*.

14, are *Piles*, or *Palliſadoes* made of *Spars*, plated or ſhod with *Iron* at the Points, having two or three *Nails* droven through them: They are ſet in two or three Rows, the loweſt Breaſt-high, and every Row higher; ſo deep, as they may not be pulled up. They are planted on the top of a *Breach*, or on ſome *Paſs* on a ſudden.

15, is a *Barricade*, to plant on a *Paſs*, or on the top of a *Breach*.

CHAP. IX.

Of Beſieging Towns.

When a *General* does intend to Beſiege a *Town* or *Fort*, he firſt ſends to Inveſt it, with a Body of *Horſe*, Commanded by a *Lieutenant General*, and a *Camp-Mariſhal*, that no ſuccour may go in whilſt he marches with the reſt of his *Army* to it; and to that end they take care to ſtop all the *Ways*, *Paſſage*, and *Intelligence* that may be ſent either in or out, of the *Town*. This is called the Blocking up the *Town*.

When the *Army* is come before the *Town*, if it be Situated on a *River*, there muſt be made a Detachment of ſome part of the *Army*, and ſend them of the other ſide of the *River*, to take up their Quarters, having *Bridges* of *Communication* laid over, and *Redoubts* made to defend them, in which there muſt be put a ſtrong *Guard* of *Foot*.

If the place be ſurrounded with *Hills*, then the *General* poſſeſſes himſelf of the heights of them.

As ſoon as the place is Blocked up, and Conſequently the reſt of the *Army*, *Baggage*, *Proviſions*, *Ammunition* of *War*, and the *Artillery* are arrived, and the *General* hath formed out his *Camp* for the *Army*, which in a Siege always *Incamps* with theirs Backs to the *Town*, having *Squadrons* of *Horſe* betwixt each *Battalion*; then the *Engineers* mark out the *Line* of *Contravallation*, called breaking of Ground, which is to be choſen be-

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beyond *Musket-Shot*, or *Falcon* from the *Town*, under which the *Cavalry* may securly lodge.

This *Line* is carried round about the *Town*, if the Garison be very strong, and full of Men; else on one part.

If the *Enemy* have *Armies* near, and that its thought they will endeavour to raise the Siege, before the *Town* can be taken, then the *Engineers* mark out another *Line*, further into the *Campaign*, whis is called the *Line* of *Circumvallation*. This *Line* is carried round about Inclosing Ground enough for all the *Army* to lodge in. The *Quarters* of the *General*, and other chief *Commanders*, are to be placed round about, so as one may relieve another conveniently.

Upon this *Line*, within *MusketShot* one from another, are to be placed *Redoubts*, *Triangles*, *Long Squares*, and other *Fields-Works*; each *Regiment* is to Work at them before their own *Camp*. Their *Ramperts* are generally some 8 or 10 *Foot* thick, 6 *Foot* high, with a *Foot-bank* to mount upon the *Parapets*. The outward height 5 *Foot*, the *Ditch* cast about them 10 or 12 *Foot* broad, and 4, 5 or 6 *Foot* deep, altho the proportions are to be made all ways according to the danger the *Enemy* may put the *Army* unto.

The next thing to do, is opening of the *Trenches*, that is, beginning the *Lines* of Approaches towards the *Town*, at about 1200 *Foot* from it. To this end the Colonel, or Commander of the *Infantry*, (whose business is to open them, ought early in the Morning to visit the *General*, or more particulary the *Lieutenant-General*, if he be appointed for this Action; and it were necessary he had well reviewed the place himself, before he comes to discourse with those that know it. When the *Regiments* make their Detachments, are to furnish such number of Workmen that ever requireth; and besides their ordinary they take along with them *Spades*, *Axes*, and other Materials necessary The *Egineer* is to shew and inform how they are to run their *Line*, draws out to them as necessity requires, diverse lengths, but most commonly at 40 *Rods* long, or sometimes shorter et, and broken and turned as often as is ry.

at the *Workmen* may begin with the more where the *Line* begins (which is with a place of Arms) there is to be built a *Redoubt Battery* with *Guns*, and there are covered from the *Enemies Cannon*, by two great Espaulments well *Flanked*, several *Guards* of *Foot* and *Horse*, standing near to defend them, if the Besieged should Sally out. The *Line* being laid out and marked, which is to be carried on Obliquely, so that no Shot can be made out of any Work of the *Town*, that may scour that *Line*, the *Egineers* are to divide and place the *Workmen*, in order that one may not hinder another.

Now they give to every Man, the length of 4 or 5 *Foot*, and every one maketh as much hast a possible to get into the Ground, for the avoiding of the danger whereunto he is exposed while he stands upon the open *Field*. To this end the *Earth* which he diggeth, he casteth up before him, and he is to dig the Hole so deep, that with the *Earth* thrown up he may be under Covert, which will be when he digs three *Feet* into the Ground, the *Earth* thrown up making other three above the Ground, or 6 *Foot* in all.

The Workmen being thus got into the Ground, they enlarge and deepen the *Trenches*, as necessity requires; as when they come nearer to a *Fortress*, they are to be made deeper. The breadth or width of them may be 12 or 14 *Foot* at the Top, and 6, 8 or 10 *Foot* at the Bottom, with *Foot-banks* for the convenience of *Musquetteers*; sometimes one is constrained to make them larger, in regard *Wagons* may be driven through them, with Materials necessary for the *Gallery*; and also *Cannon* must be drawn down and mounted on the *Batteries*. But it is always to be observed, by how much larger the Approaches are made, by so much ought the *Parapet* of the *Trench* to be hightend, that the *Enemy* may not discover the *Souldiers* that are in them; especially one ought to heighten those Points, and Windings where the *Line* turns; and when it cannot be conveniently done, the *Souldiers* are to take great *Facines*, and cover the place that is seen with them.

The *Trenches* are to be relieved every 24 Hours; and in short, are to be ordered with great care.

If the Ground be *Rocky*, *Moorish* or *Marshy* with *Bogs*, where one cannot dig, then there is a Foundation made with *Sinkers*, that is, Bundles of *Boughs* fastned together, upon which *Earth* is cast. Upon this Foundation there are *Traverses* and *Gabions*, which are described in the last Chapter. These *Gabions* are used also in stony Ground, where one cannot dig the *Earth*, because of *Stones*.

As the *Trench* advances, there are at the Windings and turnings, *Batteries* to be made about 10, 12 or 16 *Foot* high, the *Breast-Works* made with *Gabions*, or Sacks of *Earth*, and *Cannon-baskets*; these *Batteries* are to shoot into the *Town*, to beat down the *Houses* and terrify the *Burgers*, and to play continually Day and Night. Or *Batteries* may be made on any Hill, or rising Ground to this effect.

There must be a good *Line* of *Communication*, betwixt the two, or more Approaches; when they are once advanced to the *Foot* of the *Glassis* take in and fortify the Ground betwixt the *Attaques*, by which means the *Enemy* coming to *sally* out, will find themselves betwixt two *Firings*.

In the carrying on the *Lines* of *Approaches* and *Batteries*, the *Engineers* must be sure to be provided of *Pallisadoes de Camp*, and *Piles* of 6 *Foot*, *Turn-Pikes*, *Horse de Freez*, *Barricadoes* or a Fence made of *Pallisadoes*, Thousands of *Crow-Feet*, or *Carthrops* to hinder the March of *Horse*, together with good store of Planks and Timber ready.

The nearer the Approaches advance to the *Fortress*, and the more *Souldiers* are exposed to danger, their Pay is encreased every Day; sometimes they have half a Crown a Night, and sometime a Crown for an Hours work, if their *Post* be Dangerous.

Every Morning as soon as Day begins to break, the *Lieutenant General*, or *Marshal de Camp*, orders the

the *Soldiers* too low to the Trenches, and there take their places, to Fire continually, and hinder the Enemy from shewing their Heads above the *Works*, whilst the *Cannon* from the *Batteries* are beating down the *Parapets*, and levelling the *Works*; the *Batteries* to this end are advanced as the *Attaques* advance, and the best place for them is betwixt the two *Attaques*; for by this means one disposes them in such a manner, that he is Master of the Firings of the two *Flanks*, of the two opposite *Bastions*.

When the Approaches are advanced to the *Counterscarp*, along the *Breast-work* of it, there is to be made a great *Lodgment*, in the middle of which, there is a Descent cut into the *Ditch*, which is called the *Sap*; When it is brought to the *Ditch* or *Moat*, there must be good store of *Pioneers* employed to run Earth in *Wheel-Barrows* Night and Day to fill up the *Ditch*, and as soon as it is dark the *Horse* of the *Army*; but those that are upon the Guards to carry *Facins* to the Tail of the *Trenches*, to be cast into the *Moat*, to fill it up even to that place where the *Mine* is to be made; for in so doing, the *Ditch* will be filled up by degrees, and there will be a good Foundation for the *Gallery* to rest upon; the *Pioneers* fetch in their *Wheel-Barrows* good store of Earth, upon Planks laid in the *Gallery*, and bring it to the Mouth thereof, casting it upon a heap, and some *Workmen* appointed to work in the Mouth of the *Gallery*, cast it into the *Moat*, to settle the *Facins* and *Fagots*.

This Earth thus cast up, serves to cover and make *Blinds* for the *Workmen*, which they use to make at the Mouth of the *Sap*, and continue so doing till they bring the *Gallery* to the Face of *Bastion*. The *Blinds* are to be raised on that side which respects the *Enemies Curtain*, and opposite *Flank*.

To bring on the *Gallery*, first, there is made two Frames of *Timber*, some 8 or 10 *foot* wide, and about 9 in height, in form of a *Gallows*; the *Timber* may be 6 or 8 *Inches* thick, and the side oppoite to the *Enemies Flank*, ought to be double planked. These Frames ought to stand 6 or 7 *foot* from one another, and so one after another, till the *Gallery* reach to the Foot of the *Bastion*.

The *Gallery* is to be covered at the Top with Earth a Foot thick, to hinder *Fireworks* from burning it; there are little *Windows* made in the *Gallery*, betwixt every 3 or 4 *Frames* to give the *Workmen* light.

When the *Gallery* is thus brought to the Face of the *Bastion*; The next thing is to make a *Mine*, which is to be done by *Miners*, who are to have *Pick-Axes* and all kind of *Masons Tools*, with all things requisite to pierce and break the *Wall*. The height of the *Mine* is about 4 or 4 ½ *foot* high at the most, the breadth about 3 ½ *foot*, according to which Measures the Props and Planks are framed, wherewith the *Mine* is underproped. The *Earth* that is taken out of the *Mine* under a *Rampert* or *Bastion*, is to be carried away in a Vessel, or Pail of Leather, which is light in handing it one to another, till it be brought out of the Hole or entrance of the *Mine*, and laid in the *Gallery*, to the end the Enemy may not see it, and gess whereabouts the *Mine* is.

The *Mine* is wrought on by several Turns; to prevent the Blast of Powder coming forewards, sometimes the *Master Miner* makes use of a *Compass*, and Conduct his *Mine* by the help of the *Needle*, that he may carry it right, and always the nearer he comes to the place where the *Chamber* is to be, the narrower he makes the way of the *Mine*, in such sort, that it be no broader or higher at the entrance into the *Chamber*, than a Barrel of Powder may scarcely pass into it, for by this means the *Mine* is easier stopt.

The bigness of the *Chamber* is made according to the greatness and proportion of the *Wall* and *Rampert*. The common Opinion is, that a Barrel of Powder will blow up 12 *foot* of Earth; the Barrels are to be laid in such order, that in an instant they may all take Fire together. The *Chamber* may be made 10 or 12 *foot* wide, and about 5 *foot* high; The Earth is to be blown up either into the *Fortress*, or else without, by making that side which is to be blown up, not so thick as the other. Thus having made the *Mine*, place the Powder herein, and close up the Mouth of it; which must be carefully done, putting cross *Timbers* in every Return; and at the entrance stop it with thick and strong Planks, rammed in with Earth, leaving a Trunk or hollow Pipe all the way filled with *Powder*, and carried to the end of the *Mine*, at the *Wall* where the Passage is to be well stopped, since the stronger a *Mine* is stopt, it takes the better effect; then fire it as soon as conveniently may be, lest the *Powder* take harm by too much moisture; after which follows the Assault, and seconding the *Mine*, if the Breach be made considerable.

CHAP. X.

Of defending a Town or Fort.

IT is a certain Rule, That where there is an *Offensive War*, there is also a *Defensive*; and therefore as soon as the Governor of any *Fort* gets notice of an *Army* coming before it to Besiege the place; and before they form their *Blocus*, or *Block it up*, he sends the Gunners to the *Batteries*, with orders to shoot several *Cannon*, to inform the *Country* Round, and give the Signal of retreat, that they may come in with all the Provisions they can find about the place; And also by making several Shot, keep off the *Light-Horsemen* and Spies that they approach not so neer, as to view the *Works* of the *Fort*; and also to favour the *Foot* and *Horse*, who ought every day to make a Sally, to shew that the *Garison* is strong, and in good Heart: The *Infantry* must not go beyond *Musket Shot*; but the *Cavalry* ought every day from the opening of the *Trenches* to sally in small Squadrons to draw the *Army* near, that it may lay open to the *Cannoneers*, who may make some good Shot, and cut off some of the Principal *Officers*.

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If the *Garison* be but weak, then the *Governor* is to manage it to the best Advantage; and is not obstinately to defend the *Out-Works*, but rather to look to the defence of the *Ditch*, and the Body of the place, that the *Flanks* be well furnished with *Cannon*, and as soon as he perceives the *Attaques* of the Enemy, is to Countermine the *Flanked Angles* of the *Out-Works*, and to blow them up, at such time as he is forced to quit them; and after having Retrenched the *Bastions* after a considerable Breach, all that he can do, is upon the most Honourable Terms to make Capitulations, as to March out with *Arms* and *Baggage*, *Drums Beating*, *Trumpets Sounding*, *Colours* and *Standards Flying*, Matches lighted at both ends, *Bullets* in their *Mouths*, with some Pieces of *Cannon* and *Mortars*, and Ammunition necessary, the *Besiegers* furnishing them with *Wagons*, *Horses*, and every thing necessary for their March. But if the *Garison* be considerable strong, it is to be Governed quite in another manner.

The *Governor* is to husband the *Provisions* well, and defend boldly the *Out-Works*, and to *Counter-Mine* round about them, as the *Enemy* shall Attack, and to Retrench them, and also to make *Retrenchments*, and *Barricadoes* all along the *Covered Way*; that he may lose all things piece by piece, and to quit nothing but by main force.

After the *Governor* is Advertised, by small parties he sends out, what part the *Enemy* will Attack, he is always to Anoy them by continual small *Sallies* of the stoutest *Souldiers* two by two, and three by three, who are to Fire upon the *Pioneers*, by creeping into the Field unperceived, and not to give them rest or let the *Trenches* be quiet, and afterwards to Retreat into the *Counterscarp*; and in the mean time the *Governor* is to have the *Souldiers* in readiness, to give Fire as soon as the Party is returned, by which commonly many *Officers* are killed that do advance; to this end the *Out-Works* are to be well furnished with men, to keep continually Firing; and to render them the more able, they are to be relieved twice a Day, and twice a Night.

It is very ordinary to the *Garison*, to mak a great and brisk *Sally* about *Sun-Rising*, or break of Day, after a Stormy or Rainy Night, as opportunity admits; and to carry along with them a quantity of Nails to cloy the *Guns*, *Pick-Axes*, *Spades* and *Shovels* to throw down their *Lodgment*, some *Granadiers*, and *Musquetoons*, to make a considerable Assault, and to throw down their *Works* in such manner, that the *Enemy* coming to regain Ground, may lay open to the *Shot* from the *Out-Works*, which ought especially then to be well furnished with men, and in Readiness to make a continual Firing, to favour the Retreat of the *Sally*; and to by this means the *Enemy* shall not gain a Foot of Ground but at a very dear rate, and lose much of his time before he be able to gain any of the *Out-Works*. The *Out-Works* ought to be *Mined* and *Retrenched*, and the *Mines* Fired when the *Enemy* makes a *Lodgment* on them, and the *Garison* forced to retire to their *Retrenchments*.

The *Retrenchments* turn to account when their *Ditch* is 12 *feet* broad at top, and 6 *feet* at the bottom, and 8 *feet* deep; and the *Earth* that comes out of the *Ditch* makes a good *Parapet*. All these *Retrenchments* and Cuttings of are to lye open towards the *Town*, or *Fortress* with this *Proviso* also, that they be not made so high, but that the main *Works* may overlook and command them.

When the *Garrison* is forced to quit their last *Retrenchments* on the *Out-Works*, and Retreat into the *Town*, the *Governour* is to have the *Flanks* well furnish'd with *Cannon*, which may beat upon the *Flanked Angles*, and scour the *Ditch*: for there is nothing makes greater slaughter, or with greater ease hinders *Undermining* than this and it is almost impossible for the *Enemy* to make any *Lodgment*, or set any *Miners* at work upon the Body of the place; and being not able to make a Breach, but by their *Cannon*, it is soon repaired with *Pallisadoes*, and the *Bastion* cut off and Retrenched with *Mines* prepared under the Breach, and the *Batteries* made firm before they can *Storm*; and for some Days they cannot make any *Lodgment*, notwithstanding they have won the *flanked Angles*, and made a considerable Breach, even to the Foot of the *Bastion*, yet they cannot maintain it but with great loss; neither can they avoid the *Granadoes*, and *Fire-Works*, that will be continually cast upon them, and so forced to approach by *Sap*, which may be with all facility imaginable Rencountered.

If the *Enemy* by dismounting the *Guns* on the *Flanks* and *Batteries*, with their *Counter-Batteries* approach to the Foot of the *Bastion*, and set their *Miners* at work, and prepare their *Mines*; then the *Governour* is diligently to search out the *Enemies Mines*, and being assured of the place where they are hid, and a working, which may be done by setting a *Drum* in the place suspected, with some *Dice*, or *Pease* upon the *Head* of it, which with any stirring will leap upon the *Drum*, when it stands over the place where the *Miners* are at work.

After the place is thus found out, nothing remains but to make a *Countermine* against them, which is made after the same manner, as a *Mine*, described in the last *Chapter*. Now, because one is not sure to meet just with the *Enemies Mine*, which may be made either too high, or too low; therefore there are several *Mines* to be made, till by one of them the *Enemies Mine* is found out, and so take away their *Powder* out of the *Chamber*.

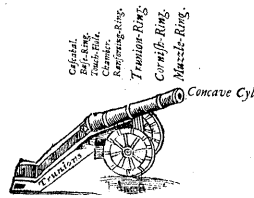
When an *Enemies Mine* is carried so secret, and hidden, that one cannot find it out; then the *Garrison* must of necessity resolve to quit that part of the *Rampert*, or *Bastion*, under which they suspect there is a *Mine*, and so Retrench and Cut it off inwardly; but for their advantage they must make ready also their *Counter-Mines* made in that place, and *Chamber* their *Powder*; attending the effect of the *Enemies Mine*; and when they spring it, they must retire themselves into their new *Work* cut off, or *Retrenchment*; and the *Enemy* being Lodged on that part of the *Rampert*, or *Bastion*, which they have quitted, then the *Counter-Mine* is to be blown up. The like is also done in *Out-Works*, and on the *Counterscarp*, when one is driven to quit them.

CHAP.

CHAP. XI.

Of GUNNERY.

THE General things to be known in the Art of *Gunnery*, next after the *Names* and *Parts* of a *Piece* of *Ordnance* (which you may here learn from the *Figure* of the *Gun*) in order to *Shoot* securely, and make a good *Shot*, are, First, That the *Piece* be well *Tertiated*, or squared upon its *Carriage*, and to know duly to Load and Level the *Piece*.



To *Tertiate* a *Piece*, is to know if it has its due thickness of *Metal* at the *Touch-hole*, *Trunions*, and *Neck*; by which you may judge at the strength of the *Gun*, whether well fortified, or no. This you do with a *Caliper* pair of *Compasses*; and if the *Piece* be Home boared, the *Diameter* less by the height divided by 2, is the thickness at any place.

To *Quadrate*, or *Square* a *Piece* mounted, is to see if it is directly placed, and equally poised, which depends on the *Carriage*, in regard of the *Wheels* and *Axel-Tree*.

To *Dispart* a *Piece* of *Ordnance*, is to set such a mark upon the *Muzzle-Ring*, or thereabouts, that the visual *Ray*, or *Sight-Line*, taken upon the Top of the *Base-Ring* against the *Touch-hole*, by the Mark set at, or near the *Muzzle-Ring*, may be parallel to the *Axis* of the *Concave Cylinder*. To do this, take the *Diameters* of the *Base-Ring*, and the place at the *Muzzle* where you intend the *Dispart* to stand; divide the difference of these two into two equal parts, one of them will be the *Dispart*, which you may set upon the *Gun* with *Pitch*, or *Wax*. If you have not *Compasses*, measure the *Circles* about, and work with them.

The *Weights* of *Shot* are regulated by the *Cubes* of the *Diameters*, and by knowing the weight of one, the weight of any other is found, thus:

A *Bullet* of *Iron* of 4 *Inches Diameter* is found by Experience to weigh 9 *lb.* then say, as the *Cube* of 4 is to 9 *lb.* so is any other *Diameter* Cubed to its weight; or as 9 *lb.* is to the *Cube* of 4, so is any other weight to the *Cube Root* of its *Diameter*. *Lead* and *Iron* in weight is as 4 to 3, that is, a *Shot* of 2 *lb.* of *Iron*, and a *Shot* of 3 *lb.* of *Lead*, will have the same *Diameter* of height. *Iron* to *Stone* is as 3 to 8; *Lead* to *Stone*, as 4 to 1; that is, a *Bullet* of *Stone* of 10 *lb.* is equal in height to a *Bullet* of *Lead* of 40 *lb.* Therefore knowing what a *Bullet* of *Iron* of any *Diameter* weighs, you will find the weight of a *Bullet* of the same *Diameter* of *Lead*, and *Stone*; for *Lead* having the weight of 9 *lb.* of *Iron* for 4 *Inches Diameter*. If 3 give 2, what will 9 *lb.* give? Answer 6; and so of any other. As the *Shot* is regulated by the *Cubes* of the *Diameters*, so also is the *Powder*. Suppose 1 *lb.* ½ of *Powder* be a Charge for a *Falcon* of 2: 68 *Bore* of *Diameter*; what weight in *Powder* will be fit for a Charge of a *Cannon* of 7? The proportion is thus: As the *Cube* of 2: 68 is to 1 *lb.* ½ of *Powder*, so is the *Cube* of 7 to 26.

The Names of the *Pieces* of *Ordnance*, which are taken from the height of the *Bore*, are set down in the following *Table*, which gives in the first *Column* the Names of the *Pieces*; next, the weight of *Fortified Guns*; the third, the height of the *Bore*; the fourth, the height of the *Shot*; the fifth, the weight of the *Shot*; the sixth, *Powder* for *Proof*; the seventh, *Powder* for Service; the eighth, *Paces* (five *Foot* to a *Pace*) the *Piece* shoots *Point-Blank*, or upon the *Level*; the ninth, the outmost Random, the *Piece* mounted to 45 *Degrees*; the tenth, the *Horses*; and the eleventh, the *Men* required to draw a *Piece* of *Ordnance*.

Names.	Guns weight.	Height Bore.	Height Shot.	Weight of Shot.	Powder for Proof.	Powder for Service	Paces Point Blank.	Utmost Random.	Horses to Draw.	Men to Draw.
	C.			lb.	lb.	lb.				
Can. 8.	70	8	7.75	63	28	23	180	1800	18	100
Can. 7.	60	47	6.75	42	24	18	180	1800	16	80
Dem.C.	50	46.3	6.05	32	20	15	180	1800	12	60
24 lb.	40	5.87	5.62	24	17	11	180	1810	10	50
Culv.	40	5.32	5.07	18	14	10	184	1840	8	56
12 lb.	35	4.46	4.64	12	10.5	8	178	1780	6	40
Dem.C.	30	4.25	4.03	9	9	7	175	1750	6	35
Saker.	20	3.58	3.40	5½	5.25	4	160	1600	4	25
Minion.	12	3.35	3.18	4	4	3	120	1200	3	16
Falcon.	5	2.68	2.54	2½	2	1	120	1200	2	10

As to the several *Shootings* in *Artillery*, and the knowledg of the true Distance that any piece will carry to, is a matter that depends upon many uncertainties, there being such varieties in the trueness of the *Bore*, in the heights of the *Shot*, in the strength of the *Powder*, in the *Disparts*, in the *Levelling*, and *Direction*, in the *Air*, *Wind*, &c.

The *Ball*, when it is *Shot*, flies through the *Air* with a violent, mixt and natural Motion, describing a *Parabolical Line*, in whose beginning, and end are *Lines* sensibly streight, and in the middle, Curved. The *Shootings*, or *Shots* in *Artillery*, are therefore three; The first is called *Point-Blank*, which is that

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that Space, that the *Ball* flies in a *Line* ſenſibly right without any inclination; The ſecond is called the *Mean*, which comprehends all that Space the ſhot flies in a *Curved Line*; The third is called the *Dead-Shot*, which is the fall of the *Ball* by a ſenſible right *Line* towards the Ground, after that the violence is ceaſed.

Gunners do take notice of theſe three differences, and *Ranges* of *Shot*, for three ſeveral ends. The *Shots* of *Point-Blank* ſerve to Batter the *Ramperts* and *Walls* of *Forts*, and *Caſtles*; the *Mean*, or *Middle Range* to moleſt afar off the *Troops* in the *Campaign*, and in their *Quarters*, and to ruine the *Houſes* within the *Cities*, and *Caſtles*, &c. The *Dead-Shots* ſerve for *Mortars* to ſhoot *Bombs*, and other Artificial *Fire* upon the *Enemy*, eſpecially when they cannot be otherwiſe offended, nor ſeen; being covered behind with *Ramperts*, *Trenches*, *Hills*, and other *Eminencies*.

A ſhot *Point-Blank*, which is the moſt ordinary and moſt Important, is diſtinguiſhed, in regard of the *Horizon*, and in regard of the Object which it ſtrikes. As to the *Horizon* they are of three ſorts, Firſt, *Level*; Secondly from *Low* to *High*; Thirdly, from *High* to *Low*, called *Under Metal*.

The *Horizontal*, and by the Level of the *Chaſe*, or *Concave Cylinder* is the moſt ſecure, and certain.

That from *Low* to *High*, proves fallacious, becauſe by the Recoyling which the *Piece* makes, the *Shot* flies higher than the Mark; and that from *High* to *Low* is moſt fallacious, becauſe the *Shot* (beſides other notable effects) comes more *Low* by the Recoyling of the *Piece*. Therefore an experienced *Gunner* muſt remedy theſe faults by taking the due advantages in *Shooting*.

As to the Object, a *Shot Point-Blank* is made either at right *Angles* againſt the *Superficies* of the Object, or at oblique *Angles*. At right *Angles* it ſtrikes more furiouſly than at oblique; therefore it is uſed againſt *ſtrong Walls*, to batter them; and are uſed to make *Batteries* of ſeveral *Tire*, and diſcharging them againſt the ſelf-ſame Mark, and in the ſame inſtant. At oblique *Angles* they ſtrike either Croſs-ways, or Rebounding, like a *Tennis-Ball*. If they ſtrike Croſs-ways, with two *Batteries* one upon each ſide of the Object, it ruines more ſpeedily the Defence either of *Earth*, or *Wall*; if they batter Obliquely, or by a Rebound, which is done when they cannot do it right forward: As if one would batter a *Flank* covered with an *Orillon*, or *Shoulder*, one muſt ſtrike the *Curtain* in ſo fit a place, and obliquely, that by the Rebound the *Shot* may leap into the *Flank*; holding it for a *Maxim* in this Operation, *That the Angle of Incidence is equal to the Angle of Reflection*.

The *Mean* or middle *Ranges* are diverſe, according to the different Elevations of *Ordnance*; the Elevations are regulated by the *Gunners Square*, which is an *Inſtrument* made of *Braſs* or *Wood*, of two right *Lines* (*See Fig.* 10 *Plate* 1) one longer than the other, both which make a right *Angle*, from which as from the *Center* is deſcribed an *Arch* divided into 90 *Degrees*, or into 12 equal Parts, called *Points*; ſo much of the *Arch* as exceedeth a *Quadrant*, as 45 *Degrees*, or 6 Points, ſerves for ſhooting below the *Horizon*, as the *Quadrant* doth for above. From the *Center* hangs a *Thread* with a *Plumet*, the longeſt Leg put into the *Chaſe*, or *Concave Cylinders* of a Piece of *Ordnance*, the *Thread* cutting the *Arch*, doth ſhew the *Degrees* of Elevation, or Depreſſion, one never exceeds 6 *Points*, or 95 *Degrees* of Elevation in ſhooting with long *Cannon*.

The *Dead-Shot* which is made with *Mortars*, is done by giving Elevation from the *Points* 6, or 95 *Degrees*, to the *Point* 12, or 90 *Degrees*, which are meaſured with the *Square*, or with a particular *Inſtrument* like a Level, putting a *Staff* acroſs the mouth of the *Mortar*, and upon that the *Quadrant*.

In *Shooting* in theſe its obſerved, that at the ſixth *Point* is the fartheſt off, and that at the ſeventh *Point* comes the neareſt, and at the eighth *Point* nearer; and ſo nearer and nearer to the twelfth *Point*, in which the *Bomb* falls in the ſame place from which it departed.

Of *Shots* made out of *Mortars*, betwixt the *Middle* or *Mean-Shot*, and the *Dead-Shot*, it is to be obſerved by Experience, thoſe are equal which are equally removed from the ſixth *Point* of the *Quadrant*, *viz.* that the *Bomb* fall as far diſtant, being ſhot from the ſame *Piece*, and with the ſame ſtrength at the fifth as at the ſeventh *Point*, and the ſame thing at the fourth as at the eighth, and as much at the third as at the ninth, and ſecond as the tenth.

Shots from *Mortar-Pieces* are very fallacious, ſometimes flying farther, ſomtimes ſhorter than needs, and the *Bombs* break in the Air; ſometimes after the fall they do not break, which gives time to the *Enemy* to retire, or to Choak it; therefore to have a juſt Blow, and to take effect, theſe following Advertiſements muſt be obſerved.

Firſt, One ought to know how many *Paces* are to the place which you would ſhoot, which may be done with an *Inſtrument*.

Secondly, That the *Bombs*, or other Bodies, which are to be *Shot*, be of equal weight, otherwiſe the *Shots* will vary.

Thirdly, That the *Carriage* in breadth be always upon a Level, and without any Deſcent, that it do not leap in Diſcharging.

Fourthly, That the *Powder* with which the *Mortar* is loaded, be always of the ſame force and weight.

Fifthly, That the Charge of the *Mortar*, as well in *Powder* as in *Wadding*, be always ramm'd in with Blows equally heavy, and of equal number.

Sixthly, That the *Fuſees* be newly made in thoſe days they are to be uſed, and that they be made of a mixture proportionable to the Range the *Shot* ſhall make in the *Air*, and that it break in the very Fall; which Skill is in the *Fuſee* filled with mixture of Compoſition, which is to be ſuch, that although the *Bomb* fall in the *Water*, it ought to break.

To

To meaſure a juſt Time, is done by filling the *Fuſee* after the ordinary manner; take a ſmall *Barrel* or *Cane* of *Iron* of equal *Bore* to that of the *Fuſee*, but ſomething longer, with many little Holes all along its length, and filling it in the ſame manner as the *Fuſee*, then the *Bomb* being fitted in the *Mortar*, you give Fire at the ſame time to the *Fuſee* in the *Mortar* and the *Iron-Barrel*, letting the *Barrel* burn until you ſee the *Bomb* break; in which moment, you obſerve the *Barrel*, and to what Hole the *Fire* burns down, which will give an aſſured mark of the time the *Fuſee* ought to have.

If the *Bomb* in the very Fall ſhall break, the ſame quantity of Compoſition ſhould be continued in the *Fuſee*, but if it break before the Fall you muſt abate the Heat, by adding a ſmall mixture of *Charcoal-Duſt* incorporated in the ſame Compoſition; and if after its Fall it ſhall delay its effect, then you ſhall joyn with its mixture a little fine *Powder-Duſt*, and ſo you may by Experience with this *Barrel* obſerve into what Mark or Hole it burns, ſo that with ſuch *Fuſees* the *Bomb* ſhall juſtly break in the very Fall amongſt the *Enemies*, obſerving always to fill the *Barrel* with the ſame mixture.

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MUSICK.

Musick is the Art of making Harmony, either by *Voice* or *Instrument*; Or, (which is the same thing) the Art of well Singing, or playing on *Musical Instruments*. The first is called *Vocal*, the other *Instrumental Musick*, and consists both of *Sounds*.

A *Sound* is that which affects the *Ear*, of which there are two Sorts, *Simple* and *Compound*; The *Simple* is considered by it self.

There are 20 *Simple*, or *Single Sounds* mentioned by *Musicians*, from *Gam-ut* to *E-la*, and all contained in the *Gam-ut*; which is called the *Scale*, invented by one *Guido Aretin* an *Italian*, the better to learn to *Sing* and *Play* well: The Enumeration of which *Simple Sounds* take as followeth.

The first, *Gam-ut*; fecond, *A-re*; third, *B-mi*; fourth, *C-fa-ut*; fifth, *D-sol-re*; fixth, *E-la-mi*; feventh, *F-fa-ut*; eighth, *G-sol-re*; ninth, *A-la-mi-re*; tenth, *B-fa-B-mi*; eleventh, *C-sol-fa-ut*; twelfth, *D-la-sol-re*; thirteenth, *E-la-mi*; fourteenth, *F-fa-ut*; fifteenth, *G-sol-re-ut*; fixteenth, *A-la-mi-re*; feventeenth, *B-fa-B-mi*; eighteenth, *C-sol-fa*; nineteenth, *D-la-sol*; twentieth, *E-la*.

Of which *Simple Sounds*, first are to be considered the *Accidents*, and then their *Division*.

Their *Accidents* are *Musical Time*, or *Measure*.

Time in *Musick* is a quantity which either lengthens, or shortens the *Sound*.

The *Musical Time* to expresse the *Sound*, is known by eight *Characters*, viz. *A Large*, *A Long*, *A Breve*, *A Semibreve*, *A Minim*, *A Crochet*, *A Quaver*, and *A Semiquaver*.

But the time to suppresse the *Sound* is different, that is, in several sorts of *Rests* or *Pauses*, longer and shorter.

Musical Measure, is that by which the aforesaid *Simple Sounds* are Measured.

There are two sorts of *Measure* in *Musick*; the one *Spondaick*, and called by the Modern *Musicians Imperfect* or *Dupla*, the other *Trochaick*, which they call *Perfect*, or *Triple*.

Secondly, these *Simple Sounds* are divided into seven *Hexachords*, vulgarly called *Cleffs*.

An *Hexachord* is a Deduction, or Conduct of six *Voyces*, as *Ut*, *Re*, *Mi*, *Fa*, *Sol*, *La*.

The three first of which *Cleffs* that have *G* for their *Character*, are rough and harsh, and called *Tunes* of *B Sharp*.

The two others, whose *Characters* are *F*, are soft and sweet, and are called *Tunes* of *B Flat*.

But the other two, whose *Character* is *C*, are the mean and between both, and are called *Tunes* of a natural *Key*.

It often happens in these *Cleffs*, that the Natural *Song* is changed into *B Flat*, or into the contrary: But *Tunes* in *B Sharp*, are never changed into *B Flat*, nor those in *B Flat* into *B Sharp*.

The *Compound Sound* is that which is compounded, and repeated with another.

The *Composition* of *Sounds* is called in *Musick Interval*, that is to say, *Musical Concord*, as well of the *Voice*, as on *Instruments*; of which some are Principal *Chiefs*, the others, *effects* of the *Chiefs*.

There are three *Chiefs*, viz. a *Tone*, a *Semy Tone*, and a *Diefis*: And 4 *Effects* of the *Chiefs*; as *Diatessaron*, *Diapente*, *Diapason*, and double *Diapason*.

A *Tone* is an Interval of *Musick*, composed of two half *Tones*, and proceeding from a *Sesquioctave ration*.

Musicians call it the second perfect; for Example; If when two *Sing*, one sings *Ut*, and the other *Re*, this Composition of Sounds is called a *Tone*.

A *Demi Tone* is the Moity of a *Tone*, or of a *Sesquioctave*.

A *Tone* can't be divided by Numbers into two equal parts, but only into unequal; for when you have divided a *Tone* into two parts, you shall have two *Demi Tones*: That which is the sharp of the two, is called the *Demi Tone Major*, or greater, and is seldom in use; the other which is flat, is called the *Minor*, or less *Demi Tone*, and is only in use, and called the second Imperfect, which is made from *Mi* to *Fa*.

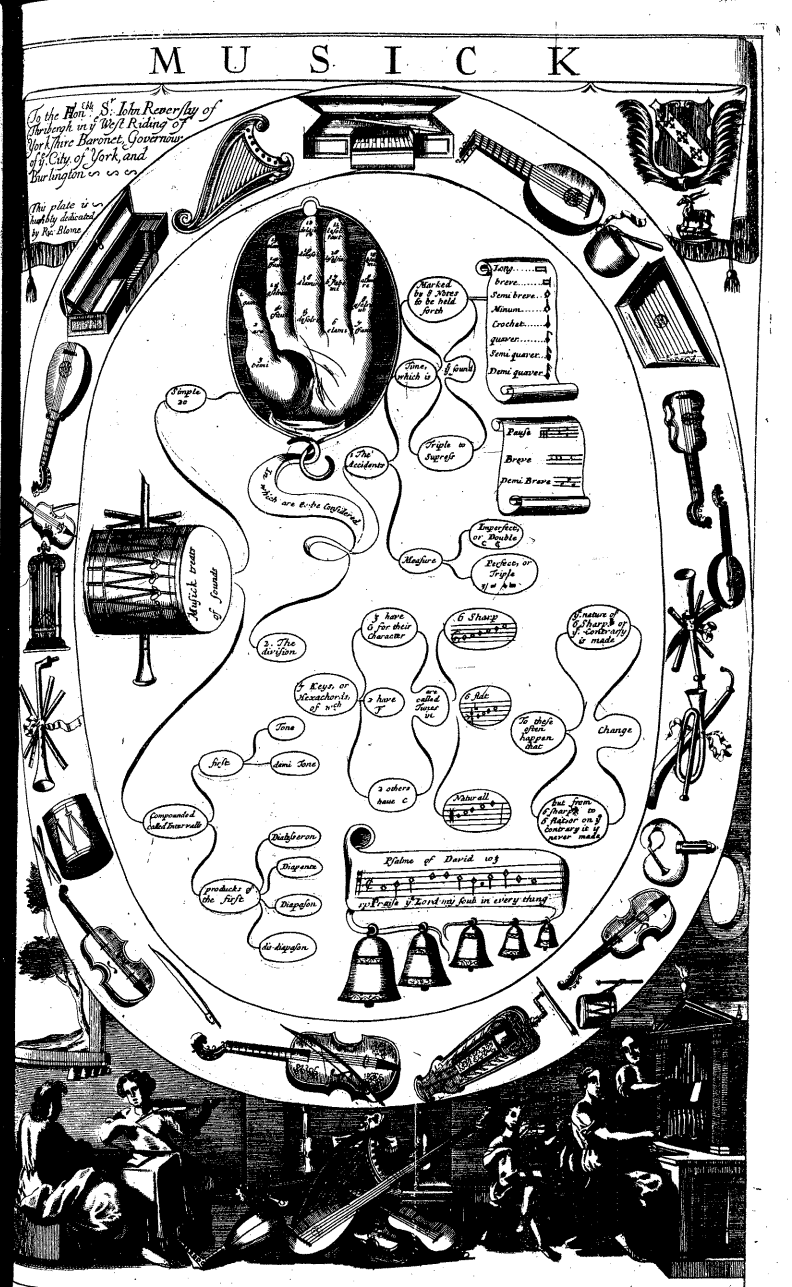
A *Diesis* or *Perfation*, (called by *Boetius* a less *Demi Tone*) is the smallest of the *Intervals*, that is to say, the fourth part of a *Tone*, or a *Sesquioctave*.

A *Diatessaron* is a soft imperfect fourth, which is frequently used, as from *Ut* to *Fa*; It contains two *Tones*, and a less *Demi Tone*.

A *Diapente* is called a fifth, which is a very sweet and frequent *Interval*; It contains three *Tones*, and one less *Demi Tone*.

A *Diapason* is a most perfect *Interval*; and very much in use, and consists of eight *Sounds*, and is called an *Octave*; It contains five *Tones*, and two less *Demi Tones*.

A Double *Diapason* is the fifteenth, or a double *Octave*, and so two *Octaves* make one intire Body of *Concords*, *viz.* the greatest *System* and *Interval*



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val in *Muſick*, which is ſo vulgarly called, as a little before, ſo as well here below, that is to ſay, twice through all the *Sounds* and eſſential *Chords*, *A,B,C,D,E,F,G.*

Beſides this *Trail* of *Muſick*, which is adapted to the *Eliptical Table*, 'tis thought fit to add this following Diſcourſe, as recommended from a perſon very knowing in the ſaid *Art*, where he ſaith, That the two chief parts of *Muſick* are *Compoſition* and *Modulation.*

Compoſition is the ſetting together of ſeveral *Muſical Notes*, into a *Tune* of ſeveral *Parts*, into a *Conſort* fit to be *Sung* or *Played.*

There chiefly belongs to *Compoſition* the Knowledge of the *Chords*, of the *Moods*, and of the ſeveral parts which make up a *Muſick Conſort.*

In all the ſeven *Notes*, (for there are in nature but ſeven diſtinct *Sounds*, however repeated in different *Keys*) an eighth, being but an *Union* to the firſt, a ninth to the ſecond, a tenth to the third, an eleventh to the fourth, a twelfth to the fifth, a thirteenth to the ſixth, a fourteenth to the ſeventh; So likewiſe in a higher *Key*, a fifteenth to the eighth, a ſixteenth to the ninth, and ſo of the reſt. In all the ſeven *Notes* (for an eighth is but the firſt of another *Septenary*; and every *Note* whatſoever is a Firſt, or *Union* in Reference to its *Octave*) there are five *Concords* and two *Diſcords*; of the five *Concords*, three are perfect *Chords*, and two *Imperfect.*

The three *Perfect* are an *Octave*, called by the *Greeks Diapaſon*, that is, from *A-re* the *Proslambanomenos* to *Alamire* the *Meſe* of the *Greeks*; *A* fifth called *Diapente*, that is, from *B-mi* the *Hypate Hypaton*, to *F-fa-ut* the *Parhypate Meſon* of the *Greeks*; and a fourth called *Diateſſeron*, that is, from *D-ſol-re* the *Lichanos-Hypaton* to *G-ſol-re-ut* the *Lichanos-Meſon* of the *Greeks.*

The two *Imperfect* are a third called by the *Greeks Ditonum*, that is, from *C-ſa-ut* the *Parhypate-Hypaton* to *E-la-mi*, the *Hypate-Meſon* of the *Greeks*; A ſixth called *Hexachordon*, that is, from *F, fa-ut* the *Parhypate-Meſon* to *D-ſol-re*, above the *Note Synemenon* of the *Greeks.*

The two *Diſcords* are a ſecond, otherwiſe called a whole *Tone*, that is, from *C-ſol-fa-ut*, the *Paranete-Synemenon* to *D-ſol re*, the *Nete-Synemenon* of the *Greeks*; and a ſeventh called *Heptachordon*, that is, from *D-la-ſol-re*, the *Nete-Synemenon* to *G-ſol-re-ut*, in the higher *Key* to the *Paranete-Hypaton* of the *Greeks.*

The moſt uſual *Moods* of the *Greeks* (for *Alipius* names fifteen) were five, the *Dorick*, the *Lydian*, the *Æolick*, the *Phrygian*, and the *Ionick.* What the uſe and nature of theſe *Greek Moods* was, is not certainly determined, even by the moſt diligent Inquirers into the *Muſick* of the Ancients; only thus much is generally noted, That the *Dorick* is the moſt grave and ſolid, the *Lydian* the moſt ſprightly, and what we now-adays generally call *Air.*

There are reckoned amongſt the Moderns four *Moods*; two great, the *Perfect* of the More, and the *Imperfect* of the Leſs: But of theſe the two laſt alone are chiefly in uſe.

The *Imperfect* of the More is, when three *Minims* go to a *Semi-brief*, with a *Prick* of Perfection; this is called *Triple-time*, and hath uſually this Mark ⁋

The *Imperfect* of the Leſs hath as the former, two *Longs* to a *Large*, two *Breves* to a *Long*, and two *Semi-breves* to a *Breve*; but in this it differs, that it hath alſo but two *Minims* to a *Semi-brief*, &c. and this is called *Time*, and thus marked ¢

The Parts of Muſical Conſort.

THere are indeed in *Muſical Conſort* but three Material Parts, *viz. Treble, Mean,* and *Baſe*; but our *Muſicians* commonly make four Parts, *viz.* the *Supremus*, or *Cantus*, that is the *Treble*; the *Altus*, or *Counter-Tenour*; the *Tenour*, which we call the *Mean*, or *Tenour*; and the *Baſſus*, which we call the *Baſe*, or loweſt Part.

In the ordering of theſe *Parts* there are two ſeveral ways of *Compoſition*, *viz. Counter-Point*, and *Deſcant.*

Counter-Point, is ſetting of Parts together in ſuch ſort, that they may anſwer each other exactly, *Note* for *Note.*

Deſcant, is the ſetting of Parts together in ſuch ſort, that the *Notes* of one may anſwer to thoſe of the other, not in equality of *Number*, but only in *Time* and *Proportion*; as two *Minims*, or four *Crochets* to a *Semi-brief*, and in like manner in all the reſt.

Modulation, is the *Muſical* performance, or expreſſion of Harmony, by *Singing* or *Playing* upon an *Inſtrument.*

In *Singing*, or *Playing*, there are five things to be obſerved. 1. The Number of their *Notes.* 2. Their *Names.* 3. Their *Tunes.* 4. Their *Times.* And 5. Their *Adjuncts.*

The Number of *Muſical Notes* is indeed but ſeven; for though from the loweſt of a *Mans Baſe*, to the higheſt of a *Boys*, or *Womans Treble*, there are reckoned 21 *Notes*; yet they are really but 7, three times repeated; ſo that the whole *Scale* of *Muſick*, commonly called the *Gamut*, ſhould reach from *Gamut* below to *F-fa-ut* above, that is, from *G*, to *F*, in the loweſt *Septenary*, or *Baſe*; from *G*, to *F*, in the middle *Septenary*, or *Mean*; and again from *G*, to *F*, in the higheſt *Septenary*, or *Treble.* But the moſt uſual *Scale* falls ſhort a *Note* in the third *Septenary*, reaching but to *E-la*; this poſſibly being ſuppoſed the ordinary Compaſs of a *Voice.* But ſome there are, who add to the *Scale* ſeveral *Notes* beneath *Gam-ut*, and above *E-la*, in *Alt*; this increaſed *Scale* being probably ſuppoſed, the extraordinay Compaſs of a *Voice*, or *Inſtrument.*

The ſecond thing to be obſerved in *Singing*, or *Playing*, is the knowledge of the Names of the ſeveral *Notes*, which are commonly joyn'd with the ſeven firſt *Letters* of the *Alphabet*, which are properly to be look'd upon as the *Cleffs*, or *Signs* of the *Notes.*

The *Names* of the Seven *Notes* are, *Ut, Re, Mi, Fa, Sol, La, Fa*; where note, that the ſeventh is called by the ſame Name as the fourth, as being but half a *Tone* above *La*, as *Fa* is above *Mi*; and the

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the truth is, considering that *Ut* and *Re* are very much rejected by Modern *Musicians*, or at least accounted but the same with *Sol* and *La*. There are indeed but four single *Names*, viz. *Mi*, *Fa*, *Sol*, *La*, though oft repeated, and variously commixt one with another, as appears in this following *Gam-ut*, or *Scale* of *Musick*.

The *Treble*, or highest *Septenary*,
F-fa-ut,
E-la,
D-la-sol,
C-sol-fa,
B-fa-bi-mi,
A-la-mi-re,
G-sol-re-ut.

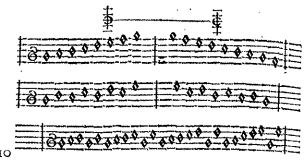
The *Mean*, or middle *Septenary*,
F-fa-ut,
E-la-mi,
D-la-sol-re,
C-sol-fa-ut,
B-fa-bi-mi,
A-la-mi-re,
G-sol-re-ut.

The *Base*, or lowest *Septenary*,
F-fa-ut,
E-la-mi,
D-sol-re,
C-fa-ut,
B-mi,
A-re,
Gam-ut.

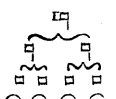
Of the seven *Cliffs*, or *Keys*, noted by the seven *Letters*, four only are in use; the first is *F-fa-ut Cliff*, which is peculiar to the *Basses*, or lower *Part*; and at the beginning of *Songs* and *Musical Airs*, is set upon the uppermost *Line* but one, and is thus marked 𝄢. The second is *C-sol-fa-ut*, which belongs to the *Mean*, or *Middle Part* and is commonly (but not always) upon the middlemost *Line*, and is thus marked 𝄡. The third is *G-sol-re-ut Cliff*, which is appropriate to the *Treble*, or Uppermost *Part*; and at the beginning of *Lessons*, or *Songs*, is usually set on the lowermost *Line* but one, being thus marked 𝄞. These are the three first and Signed *Cliffs*. The fourth, which is called *B Cliff* is unfixt to any particular *Part*, but goes through all, and serves wherever it is for the Flatning, or Sharpning of *Notes*, where it is called *B-fa*, or *B flat*, and is thus marked (♭); where it sharpneth it is called *B-mi*, or *B sharp*, being thus marked ♯.

Of all the four *Notes*, *Mi* is the principal, and claims a station in these places, viz. in *B-mi*, *E-la-mi*, and *A-la-mi-re*: In the first, as in its proper station, in the others when *B flat* chanceth to be placed there; also moreover immediately from *Mi*, *Fa-sol-la* is Sung twice upwards, and *La-sol-fa* twice downwards, and then you return to *Mi* again.

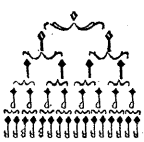
The third thing to be considered in *Singing*, or *Playing*, is the knowledge of the *Tunes* of the *Notes*, wherein this thing is chiefly to be observed, viz. that from *Mi* to *Fa*, and from *La* to *Fa*, is but half a *Tone*; but between any other two *Notes* is a whole *Tone*, as will appear in these following Examples.



The fourth thing to be considered in *Singing*, or *Playing*, is the *Time* of *Musical Notes*, which is denoted by eight several *Terms* of distinction, each having their several *Marks*, or *Characters*, and each comprehending the other double, viz. a *Large* contains two *Longs*, a *Long* two *Breves*, a *Breve* two *Semibreves*, &c.



A *Large*.
A *Long*.
A *Breve*.
A *Semibreve*.



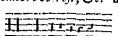
A *Semibreve*.
A *Minim*.
A *Crochet*.
A *Quaver*.
A *Semiquaver*.

The fifth thing to be considered, is the knowing the *Adjuncts*, which are these, viz. A *Tye*, a *Repeat*, a *Pause*, a *Direct*, and a *Close*.

A *Tye* is a Mark, by which two *Notes* are signified to be joyned together, and especially when two *Notes* are to be *Sung* to one *Syllable*; this *Tye* is made by a *Semicircle*, whose two *Ends* point to the two *Notes* conjoyned; as thus,

A *Repeat* is to signifie, that a part of a *Song*, or *Lesson*, is to be *Sung*, or *Played* over again from that *Note* over which it is placed, and it is thus marked 𝄇.

A *Paus*, or *Rest*, is to signifie a ceasing for the space of some *Note Sung* or *Played*; this *Paus* is named according to the name of the *Note* for which it stays, as a *Large-rest*, a *Long rest*, a *Breve-rest*, a *Semibreve-rest*, &c. all thus noted:



A *Direct*, is to shew at the end of one *Line*, where a *Note* stands in the beginning of the next *Line*; as thus marked,

A *Close* is the End of a *Song*, or *Strain*; the first is called *Perfect*, and thus marked 𝄐. The other *Imperfect*, and thus marked 𝄑.

As to the exact *Rules* of *Composing*, I refer you to larger Volumes of that *Subject*, it not being designed here.

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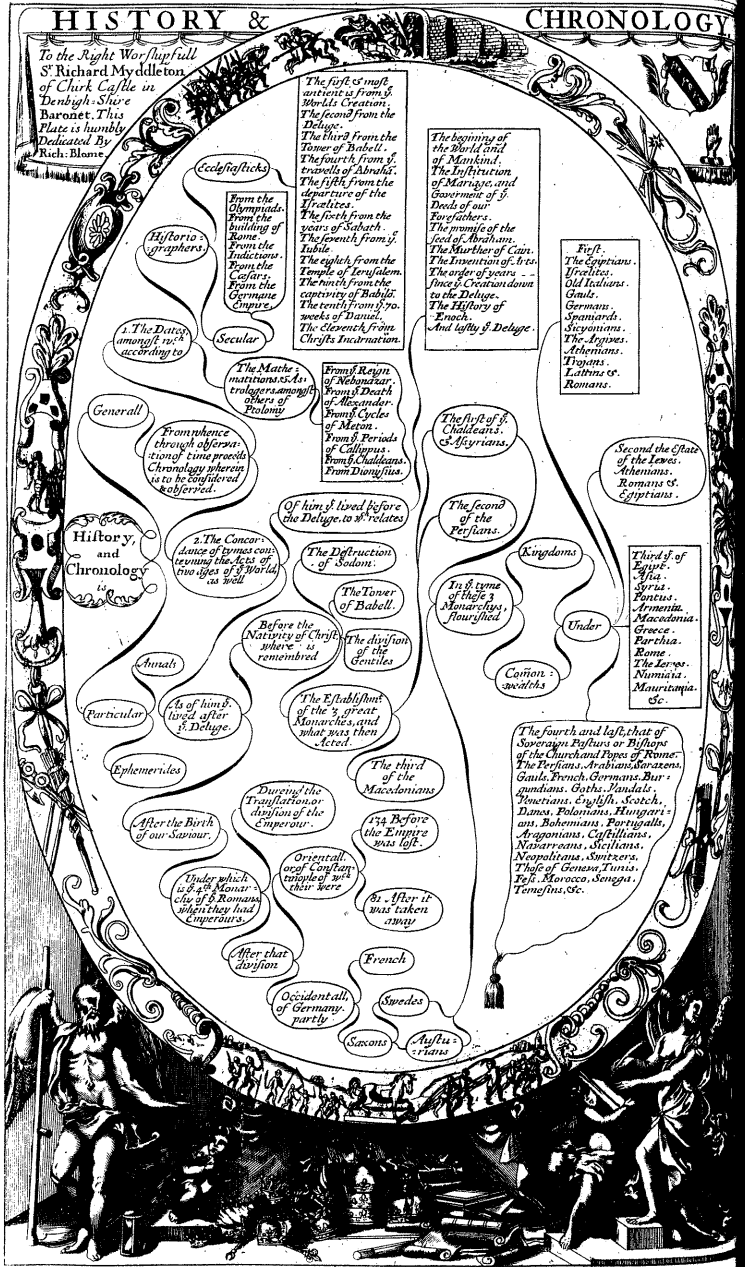
HISTORY & CHRONOLOGY
To the Right Worſhipfull Sr Richard Myddleton of Chirk Caſtle in Denbigh-Shire Baronet. This Plate is humbly Dedicated By Rich: Blome
History, and Chronology is
Ecclesiasticks
Historiographers
Secular
Generall
Particular
Annals
Ephemerides
The first & most antient is from ye Worlds Creation
The second from the Deluge
The third From the Tower of Babell
The fourth, from ye travells of Abrahā
The fifth, from the departure of the Israēlites
The sixth from the years of Sabath
The seaventh from ye Jubile
The eighth, from the Temple of Jerusalem
The ninth from the captivity of Babill
The tenth from ye 70 weeks of Daniell
The Eleventh from Christs Incarnation
From the Olympiads
From the building of Rome
From the Inductions
From the Cesars
From the Germane Empire
The Mathematitians &c. Astrologers amongst others of Ptolomy
From ye Reign of Nebonazar
From ye Death of Alexander
From ye Cycles of Meton
From ye Periods of Callippus
From ye Chaldeans
From Dionysius
From ye influence through observation of time proceds Chronology wherein is to be considered & observed
Of him ye lived before the Deluge, as he relates
2. The Concordance of tymes containing the Acts of two ages of ye World as well
The Destruction of Sodom
The Tower of Babell
Before the Nativity of Christ where is remembred
The division of the Gentiles
As of him ye lived after ye Deluge
The Establishmt of the 4 great Monarchies, and what was then Acted
After the Birth of our Saviour
Dureing the Translation or division of the Empeiour
Under which is ye 4th Monarchy of ye Romans, wh: either had Emperours
Orientall, or Contrary tymples of wch their were
After that division
Occidentall, or Germany partly
French
Swedes
Saxons
Austu-rians
The beginning of the World and of Mankind
The Institution of Marriage, and Gouvernmt of ye Deeds of our Forefathers
The promise of the seed of Abraham
The Murther of Cain
The Invention of Arts
The order of years since ye Creation down to the Deluge
The History of Enoch
And lastly ye Deluge
Firſt. The Egiptians. Israelites. Old Italians. Gauls. Germans. Spaniards. Sicyonians. The Argines. Athenians. Trojans. Lattins &c. Romans.
The first of ye Chaldeans & Assyrians
The second of the Persians
In ye tyme of these 3 Monarchys, flourished
Kingdoms
Under
Comon wealths
Second the Estate of the Jewes. Athenians. Romans &. Egiptians
Third ye of Europe. Asia. Syria. Pontus. Armenia. Macedonia. Greece. Parthia. Rome. The Jews. Numidia. Mauritania. &c.
The fourth and last, that of Sovereign Pastors or Bishops of the Church and Popes of Rome. The Persians. Arabians & Arazens. Gauls. French. Germans. Burgundians. Goths. Vandals. Venetians. English. Scotch. Danes. Polonians. Hungarians. Bohemians. Portugalls. Aragonians. Castillians. Navarreans. Sicilians. Neapolitans. Switzers. Thos of Geneva. Tunis. Fes & Morocco. Senegos. Temesins, &c.

CHRONOLOGY.

CHAP. I.

Of the Day.

THe *Day* is either *Astronomical* or *Political*, otherwise called Civil; The *Astronomical* is that which is so termed by *Astronomers*, and is divided into *Natural*, and *Artificial*.

1, The *Natural Day* is that interval of Time wherin the *Sun* departing from any Point of the *Heavens*, or from the *Meridian* returns again to the same Point; or otherwise it may be defined, The *Suns* conversion from any first *Meridian* to the same again, which is performed in the space of 24 equal *Hours*.

2, The *Artificial Day* is the space of Time from *Sun-rising* to *Sun-setting*, or the whole Time of the *Suns shining* in our *Hemisphere*, the opposite Time whereof must accordingly be called *Artificial Night*.

Note, That the *Artificial Day* differs from the *Natural*, in regard the *Natural* is always and every where the same, whereas the *Artificial* hath almost always a perpetual Mutation, especially in *Regions* remote from the *Æquator*; for, as I said, the *Artificial Day* comprehends only the space of Time comprehended between the *Suns rising* and *Setting*, being shorter in *Winter* and longer in *Summer*.

Note Secondly, That the *Days* are longer in *Summer* by reason of the *Suns* longer continuing above the *Horizon*, and the larger *Arches* of *Heaven* the *Sun* runs through in respect to our *Horizon*, as you may see in the Description of the *Sphære*: On the contrary, the *Diurnal Arches* the *Sun* makes in *Winter*, are shorter. The *Diurnal*, and *Nocturnal Arches* appear almost all equal. Not to speak of the *Twilights*, being an impression of Light from the *Sun-beams* upon the Air, either before *Sun-rising*, which is called *Diluculum*, or *Day-break*, or in the Evening after *Sun-set*.

Note Thirdly, That the *Natural Day* hath not the same beginning among all People, but is determined according to the different institution of each of them. The *Babilonians* use to denominate the *Day* from one *Sun-rising* to another. The *Italians* on the contrary from one *Sun-setting* to another, and accordingly they number their *Hours*. The Antient *Romans*, and accordingly the *Romish Church* at this day reckon from Midnight to Midnight. The *Arabians* and *Astronomers* from *Moon* to *Moon*, because the *Sun* and *Stars* keep always the same regularity to each other, in respect of the *Meridian Circle*, but not in respect of the *Horizon*, which always varies according to the variety of the *Polar Elevation*.

Nor can we in respect to the *Holy Scriptures* omit the Custom of the antient *Jewes*, who as they were commanded by *God*, began all their *Feasts* from the foregoing *Sun-setting*, according to that of *Leviticus*, *from Evening to Evening ye shall celebrate your Sabbaths*. Contrarily the *Tyrians* began their *Day* from the *Sun-rising*, and probably in this matter they differ'd not from the *Babilonians*, and other *Neighbouring Provinces*, who computed the *Hours* not from *Sun-rising*, but from its *Setting*.

Further Note, This *Natural Day* consisting of *Artificial Day* and *Night*, is called *Civil*, or *Political*, as it takes beginning, or ending from the different Institution of *People* and *Countries*; And of these *Political Days* some *Festival* or *Holy-Days*, in which *Shops* are shut up, and common Works laid aside, or *Working-Days* allotted for the exercise of all manner of Works and Professions; and these *Days* are noted in these *Tables*, or *Books*, which from the *Arabians* we call *Almanacks*, and from the *Latins*, *Calenders*; for a *Calender* is the Order and Series of all *Months*, *Lunations*, and *Festival-Days*, which happen through the *Year*; and it is called *Calender* from the *Calends*, which are the first *Days* of every *Month*.

CHAP. II.

Of the Hours.

AN *Hour* is one of those lesser Spaces of of *Time*, into which every *Day* of the *Year* is continually divided. It is more particularly thus defined: An *Hour* is the 24*th* part of a *Natural*, or the 12*th* of an *Artificial Day*.

Note First, That of *Hours*, some are called *Equal*; which are the 24 Parts (as have been said) of a *Natural Day*, otherwise term'd *Astronomical*, or *Equinoctial*; because each of them is that Space of *Time* wherein the *Æquator* ascends 15 *Degrees* above the *Horizon*, or in which the *Sun* in his Course runs through 15 *Meridians*: Each *Hour* is divided into 4 *Quarters*, and every *Quarter* into 15 *Minutes*, or *Scruples*, making in the whole 60.

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Note Secondly, Others are called *Unequal Hours* by the *Greeks*. There are 12 Parts as well of *Day*, as of *Night*; that is, as well of that Time wherein the *Sun* is above the *Horizon*, as wherein he ſtays beneath it: And they are called *Unequal*, not that the *Hours* of one and the ſame *Day*, or *Night*, are unequal amongſt themſelves; but becauſe when as there are 12 equal Parts of unequal *Days*, that is, of *Summer-Days*, and *Winter-Days*, it muſt neceſſarily follow, that the *Summer*, and *Winter-Hours*, are by this means Unequal amongſt themſelves. They are alſo called *Unequal*, becauſe in the *Summer* time the *Diurnal Hours* are longeſt, and the *Nocturnal* ſhorteſt; but in the *Winter* time quite contrary. They are alſo called *Temporary*, becauſe according to the diverſity, that is, the *Length*, or *Shortneſs* of *Days* they have different *Magnitudes*. Laſtly, They are ſaid to be *Planetary*, in regard certain Ancient *Aſtronomers* were of Opinion, that the ſeven *Planets* ruled the *Hours* ſucceſſively, that is, in ſuch a manner as this, That the firſt *Hour* of the *Day* ſhould be allotted to that *Planet* from whence the ſaid *Day* took denomination.

It is to be obſerved out of *Baronius*, in his Remarks upon the *Year* of our *Lord* 34, that the *Jews* divided as well the *Day*, as the *Night*, not only into 12 *Temporary Hours*, but alſo into 12 *Equal Parts*, as it were into 4 *Stations*, each of which contained 3 of thoſe which are called *Temporary*, and *Unequal Hours*; but the 4 Parts of the *Night* were called *Vigiliæ*, by a Name borrowed from *Vigiles*. The firſt began at *Sun-ſetting*; the ſecond ended at *Midnight*, where alſo the third began; and the fourth ended at *Sun-riſing*.

Now the 4 Parts of the *Day* were properly called *Hours*, each conſiſting (as aforeſaid) of 3 *Temporary Hours*, ſo as that the laſt part of this ſort of *Hour*, that is, the Second, was the Sixth *Common* and *Temporary Hour*, which the Third proper *Hour* of the *Jews* followed, containing of the *Temporary Hours* the Seventh, Eighth, and Ninth: And according to this Calculation St. *Mark* rightly ſaith, that our *Saviour Jeſus Chriſt*, was Crucified in the *Third Hour*, that is, in the Third of thoſe Four equal *Stations* into which the whole *Day* was divided; whereas St. *John* writing, that he was Condemned by *Pilate* in the *Sixth Hour*, that is, in the Sixth *Temporary*, or *Vulgar Hour*.

CHAP. III.

Of the Week.

THe *Week*, called by the *Latins Septimana*, is a Period of 7 *Days*, ſtill circling in a *Ring*; firſt inſtituted by *God* in the beginning of the *World*, Religiouſly obſerved by the *Hebrews*, and the obſervation thereof delivered by Tradition from them to others. But the *Hebrews* themſelves called the principal *Day* of the *Week* the *Sabbath*, as it were a *Day of Reſt*, in which *God* is ſaid to have Reſted after his finiſhing the *Worlds Creation*: Moreover, amongſt them this *Day* gave Name to the whole *Week*, ſo that *Sabbathum* was the ſame as *Hebdomada*; and what we call the firſt, ſecond, or third *Day* of the *Week*, &c. was by them called the firſt, ſecond, or third *Day*, &c. of the *Sabbath*.

The *Ethnicks* gave to each of theſe *Days* the Name of one of the 7 *Planets*, taking beginning from the *Sun*, whence the firſt *Day* was called *Dies Solis*, or *Sunday*; after which followed the reſt in order, as *dies Lunæ*, *Monday*; *dies Martis*, *Tueſday*; *dies Mercurii*, *Wedneſday*; *dies Jovis*, *Thurſday*; *dies Veneris*, *Friday*; and *dies Saturni*, *Saturday*.

The *Chriſtians* uſed to call theſe Days *Feriæ*, to ſignifie, that there ought to be a Divine keeping *Holy-day*, by Reſting from all Profane or Secular Employments, and following only *Religious Duties*, eſpecially thoſe ſet apart for the *Holy Function*. The firſt *Feria* they called *Dies Dominica*, or the *Lords Day*; becauſe on that *Day* our *Lord* and *Saviour*, *Jeſus Chriſt*, was Raiſed from the Dead. The ſeventh *Feria* ſtill retains the Name of *Sabbath*, to ſignifie, that the *Jewiſh Sabbath* was only a Type, or Shadow of the *Lords Day*, and as it were a preparation to the celebrating thereof.

For the better repreſenting the Revolution of theſe 7 *Days* throughout the whole *Year*, the 7 firſt *Letters* of the *Alphabet*, *A*, *B*, *C*, *D*, *E*, *F*, *G*, have been made choice of in ſuch an Order and Method, that each of theſe *Letters* in their turn ſhould declare the *Dominical-Day*, whence they are generally called *Dominical Letters*.

CHAP. IV.

Of the Month.

THe *Month* is twofold, *Solar*, and *Lunar*. The *Solar*, is that Space of *Time* in which the *Sun* runs through one whole *Sign* of the *Zodiack*; wherefore in conſideration that the *Sun* runs through thoſe 12 *Signs* of the *Zodiack* in 365 *Days*, and ſome odd *Hours* and *Minutes* there are attributed accordingly to ſome of the *Months* 30, and to others 31 *Days*, *February* only excepted, to which the Remainder falls, and compleats the above-mentioned number of *Days* in the *Year*. The *Lunar Month*, is that Space of *Time* in which the *Moon* runs through the *Zodiack*; or the Space between the two Conjunctions of *Sun* and *Moon*; for there is a double *Lunar Month*, one called *Periodical*, being the Space wherein the *Moon* departing from any *Point*, returns to the ſame again, that is, (as is vulgarly computed) in 27 *Days*, 7 *Hours*, and odd *Minutes*. The other *Lunary Month*, is that which they call *Synodical*, or the *Month* of the *Lunary Syzygie* or *Conjunction*, and is that Space of *Time* wherein th

the *Moon* going from the *Sun*, returns again into *Conjunction* with him; and this is ſaid to be in the Space of 29 *Days*, 12 *Hours*, and an half; for when the *Moon* finiſhes her *Period* of 27 *Days*, and 12 *Hours*, the *Sun* in the mean time makes ſome Progreſs, that is to ſay, 27 *Degrees*; and this muſt be made up in the *Moons Circle*, before ſhe can come again to her *Conjunction* with the *Sun*, which can't be done in leſs than 2 *Days*, and 5 *Hours*, which being added to the Number of the *Periodical Months*, make 29 *Days*, and 12 *Hours*; not to mention *Minutes*. And thus the *Periodical Month* are by turns of 29, and 30 *Days*; the twice 12 *Hours* remaining making in 2 *Months* one whole *Day*: And this is that ſort of *Month* that the *Year* is divided into.

Thirdly, It is to be noted, that the *Lunar Months* are joyn'd with the *Solar*; and that the *Lunation* is properly of that *Solar Month*, in which it ends, according to the Vulgar Saying,

In quo finitur Menſi Lunatio detur.

The Reaſon of this is unfolded by *Clavius* in his *Calendarium Gregorianum*, *C.* 17. that is to ſay, for that it would otherwiſe happen, that ſometimes the *Months* would ſcarce have one or another *Day* of their proper *Lunation* through the whole *Year*, eſpecially when the firſt *Lunation* of the *Year* happens upon the firſt of *January*; for the other *Lunations* of the ſame *Year*, begin only in the laſt *Days* of the *Month*.

Fourthly, Obſerve that the firſt *Month* of the *Year* amongſt the Ancient *Egyptians* was called *Thot*, amongſt the *Romans*, *Martius*; whence *July* was called *Quintilis*, and *Auguſt*, *Sextilis*; as being the fifth and ſixth *Months* from *March*. But when *Numa* added *January*, and *February*, then the uſual computation was made from the firſt of *January*.

Fifthly, It is alſo obſervable, that the *Months* were divided by the *Romans* into three ſorts of *Days*, *Calends*, *Nones*, and *Ides*. The firſt Day of every *Month* was called *Calendæ* from the *Greek* Word καλεῖν, that is, *to Call*; becauſe on that *Day* the People were called as well to the *Fairs* and *Markets*, as to the *Capitol*, to receive from the *Prieſts* what was to be obſerved for that *Month*, in reference to the Worſhip of the *gods*. Next, followed the *Nones*, ſo called, as contracted from *Nundinæ*, that is, *Fairs*, as ſome are of Opinion. Laſtly came the *Eight Days* of the *Ides*, which follow the *Nones*; theſe *Ides* are generally ſuppoſed to be ſo called from the old Word *Iduo*, which ſignifies, *to Divide*; becauſe they make a diviſion between the *Nones*, and the *Calends*; which *Calends*, becauſe they have their fixt and certain Seat in every *Month*, as falling upon the firſt Day of every *Month*, when as the Days of the *Ides*, and the *Nones*, are various diſpoſed. There are theſe following *Verſes* vulgarly made uſe of to give direction, by what Method the *Nones*, or *Ides*, are aſcribed to their reſpective *Months*;

Sex Maius Nonas October, Julius & Mars,
Quatuor, at reliqui dabit Idus quilibet octo.

So that when the *Nones* are once known, the finding out of the reſt will follow of courſe.

Sixthly, From theſe three *Days* all the reſt take their denomination: For Example, the Day which precedes the *Calends*, that is, the laſt Day of the fore going *Month*, is called *Pridie Calendas*, or *Primus Calendas*, *Secundus Calendas*, the Second Day before the *Calends*, and ſo of the reſt; and the ſame is to be ſaid proportionable of the *Nones*, and *Ides*.

CHAP. V.

As the Month, *ſo alſo the* Year *is* Twofold, viz. Solar, *and* Lunar.

I. THe *Solar Year*, is the Space of *Time* wherein the *Sun* departing from any *Cardinal Point* of *Heaven*, returns again to the ſame. The *Principal*, or *Cardinal Points*, are theſe four; the *Vernal Æquinoctial*, the *Summer Solſtice*, the *Autumnal Æquinoctial*, and the *Winter Solſtice*; which gives beginning to the four *Seaſons* of the *Year*, viz. *Spring*, *Summer*, *Autumn*, and *Winter*.

But 'tis obſerved, that amongſt the Ancient *Egyptians*, and the *Romans*, this Circuit of the *Sun* was meaſured exactly by 365 *Days*, which computation was found ſhort of the *Celeſtial Motion* about 6 *Hours*; whence it came to paſs, that every fourth *Year*, the firſt Day of the *Year*, and conſequently the reſt following loſt their place, and had no firſt Station, whereupon thoſe *Feaſts* which ought to have been celebrated at certain times, fell out ſometimes in *Winter*, and ſometimes in *Summer*, as it hapned. This Error *Julius Cæſar* at length corrected, by adding to the 365 *Days*, 6 *Hours*, which at the end of every fourth *Year* being added together, made up a *Day*, which *Day* was inſerted into the *Month* of *February*, the laſt and ſhorteſt of all the *Months*; and it is called *Biſſextile*, becauſe it is inſerted, *bis ſexto Calendas Martias*, twice on the ſixth Day before the *Calends* of *March*; and not only the *Day*, but the whole *Year* is called *Biſſextile*, or *Leap-Year*.

This Conſtitution of the *Year* was obſerved in the *Roman Empire*, and from its Author called the *Julian Account*, being twofold; the one *Common*, conſiſting of 365 *Days*; the other *Biſſextile*, of 366.

II. The *Lunar Year*, is that Space of *Time* wherein the *Sun* and *Moon* are 12 in *Conjunction*; and thus the *Lunar Year*, conſiſting of 12 *Synodical Lunations*, contains 354 *Days*; which *Lunar Year* is at this Day only in uſe amongſt the *Turks* and *Saracens*; neither hath it amongſt them any certain beginning, nor is it determined by any certain *Seaſon*, or *Point* of the *Heaven*, as amongſt us the *Julian Year* begins always about the *Winter Solſtice*. Others have ſo accommodated

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dated the *Year* to the *Moons* Motion, as to joyn a so the *Suns* Motion thereunto.

But it is to be noted, that the *Lunar Year* falls short of the *Solar* about 11 *Days*, so that if this *Year* the *New Moon* falls upon the *Calends* of *January*, the Common *Lunar Year* of 12 *Lunations* will be finish'd on the 20*th* of *December*, the *New-Moon* still going back the Space of 11 *Days*, until by the third *Year* 13 *Lunations* are brought about, the last whereof will be finish'd on the 27*th* of *December*; and this sort of *Lunar Year* is called *Embolismical*, or *Emboliſmal*, from the *Emboliſm*, or *Intercalation* of that *Lunation*. And thus the *Lunar Year*, as well as the *Solar*, is twofold; the one Common, consisting of 12 *Lunations*; the other *Embolismical*, containing 13.

It hath been observed by *Meton* a famous *Astrologer*, that the New *Moons* after the Revolution of nineteen years Elapsed, return all again to the same days, and the same point of time; for Example, if this present *Year* the New *Moon* should fall on the first of *January*, it would in like manner certainly fall on the same day on the nineteenth Year ensuing. Hence proceeds the most famous *Cycle*, or perpetual Revolution of Numbers, from one to nineteen, by the benefit whereof it may easily be understood, upon what day of every Month the New *Moon* happens, insomuch that it is used to be set down in the *Calender* in *Golden Letters*, and so it was called the *Golden Number*, being commonly desin'd to be a Revolution of Years, from 1 to 19, which Revolution being finish't, there is a return again to Unity. For *Example*, in 1653 the *Golden Number* being 1, that of the following Year will be 2, and so forward to 19; and thus the proper number of the Year in the *Decennoval Series*, extending through every day of the Year, will shew the New *Moons*, as often as it happens; but every Year of the *Golden Number* Terminates in the end of *December*, and in the beginning of *January* of the ensuing Year another takes its beginning.

And this was the Doctrine of *Meton*, which heretofore was vulgarly followed by all; but at length it was found not absolutely free from Error, for as much as by this Computation, the *Moon* appeared to have finish't her *Period* sooner by one *Hour*, and about 27 *Minutes* than she had begun it 19 Years before, whereupon after 66 *Cycles* the *Golden* was got 4 days distant from the New *Moons*; upon which the *Epacts* were brought into the room thereof, of which more hereafter in the seventh *Chapter*; however it was by no means thought fit to be left out of the *Calender*, since it is of great use for the finding out of the *Epacts* of every *Year*.

III. Divers Nations according as Custom hath prevail'd, have given different beginnings to this Year: I shall only mention the Custom of the *Jews*, and *Romans*, as being most observed throughout *Europe*.

The *Jews* heretofore began their Year from the *Vernal Æquinoctial*, because according to the common Opinion, the World was Created at that time of the Year, although when they sojourned amongst the *Ægyptians*, they conformed to their Custom, beginning the Year from the Month *Thoth*, which (by reason of the neglected Intercalation of one day every fourth Year) answered to no certain point of the *Celestial Year*; but as soon as they were come out of *Egypt*, they were commanded by God to have recourse to their old beginning, as is mentioned in the 12*th* of *Exodus*, the Month *Nisan shall be to you the beginning of Months, it shall be the first in the Months of the Year*.

But this is to be understood out of the sacred Year, to which their *Feasts*, New *Moons*, and all other sacred *Rites* were accommodated; for as the Interpreters of *Scripture* observe, that the Civil Year of the *Jews* after their departure from *Ægypt*, began from the *Month Thisri*, and all their civil Affairs and *Negotiations* were reckoned, according to the course of this *Civil Year*. Hence it is, that some *Authors* assert, that the *Jews* before *Moses*, began their Year in the *Autumn*, and make it their chief Argument to prove, that the World was Created in the *Autumnal Æquinoctial*.

The beginning of the *Roman Year*, was from the *Calends* of *January*, and consequently but a few days distant from the *Winter Solstice*: And the *Christians* have for the most part followed their Example, upon the account of our *Saviours Birth*, being so near that time. But the *Franks* not till the Year 1564, before which they began their Year from *Easter-Day*.

CHAP. VI.

Of the Gregorian Account.

THe *Catholicks* have thought fit in this one particular, to give some way to the *Jewish Ceremonies*, that is, in exactly observing the time of their *Passover*, in their Celebration of *Easter*, by reason that the one (as St. *Augustin* observes) is a *Type*, or Mysterious *Allegory* of the other; so that as the old *Passover*, as we have already mentioned, was celebrated by Gods Command in the first *Moon*, or Month of the *Year*, so also the *Christian Passover*, or *Easter* was by the *Nicene* Council ordered to be kept on that Month; and that no Controversie might arise in the Celebration thereof, they pitch upon the 14*th* day of the first Month, both as to the *Feast*, and as to be the Seat of the *Vernal Equinoctial*, accounting that the first *Month*, whose 12*th* day should fall upon the *Æquinoctial*, or immediately following it; afterwards the *Equinoctial Epoch*, was by the Judgment and Consent of the most skilful *Astronomers* determined to the 21*th* of *March*; and at length the *Golden Number* was fitted to the *Calender*, by the benefit whereof the *New-Moons*, and other *Days* of the *Moon* might be easily found. Moreover, herein also the *Christians* differed from the *Jews*, in that they appointed *Easter* to be kept not as the *Jews* did, on the very 14*th Moon* of the first Month, but on the *Lords Day* immediately following it, and that chiefly for this reason; *viz.* because on the first *Dominical*, or *Lords Day* after the *Jewish Passover*, our *Saviour* rose from the dead. For as the Author of the *Gregorian Calender* saith, the *Jews* Celebrate the *Passover* on the 14*th Moon*, which represented the Death of *Christ*, so we in this Feast Celebrate the Memory of *Christ's*, which happed on the *Dominical Day*; so that not to concur with the *Jews*, in case the 14*th Moon* of the first Month should fall upon the *Dominical Day*, the observation of *Easter* must be transferr'd to the *Lords Day* following; therefore for the more exact Celebration of *Easter*, upon which all the rest of the moveable *Feasts* depend, these three things are especially to be observed, *viz.* the *Vernal Æquinoctial*, the 14*th Moon* of the first *Month*, and the *Lords Day* following the said 14*th* Month.

But after this Constitution it came to pass, however through the mistakes of *Astronomers*, that the *Vernal Equinoctial* at length, in stead of happning on the 21*th* of *March*, it was on the 11*th*, nor could the *New Moons* be well computed by the *Golden Numbers* placed in the *Calender*; but fell out above 4 days later than their just time; and consequently, *Easter-day* could not be kept in its due turn, according to the *Sanction* of the *Nicene Council*: Whereupon by the Authority of *Pope Gregory* the 13*th*, who called together all the ableſt *Astronomers* of that Age, the *Calender* was rectified, *Anno* 1582. the Year brought to its just measure, and by taking away 10 days, the *Vernal Equinoctial* re-inſtated in its former Seat; and lastly, 30 *Epact-al Numbers* put in the room of the *Golden Number*.

According to this Form, that space of time wherein the Sun departing from any point of *Heaven*; for Example, from either *Equinoctial*, or *Solstitial Point* returns again to the same, is called the *Celestial*, or *Tropical Year*; and this sort of Year is unequal, that is, sometimes greater, and sometimes lesser by some *Scruples*; and by this means it leaves us in Obscurity as to its *Solution*. Wherefore *Astronomers* following a middle way, have allotted to the Year 365 *Days*, 5 *Hours*, and 49 *Minutes*, reckoning it as a mean between the *Tropick*, or *Celestial Year*, and the *Julian Year* which is greater by 11 *Minutes*, or *Horary Scruples*; and because the *Julian Year* though greater than the *Tropical*, was not however totally thrown aside, it was provided to prevent all Error for the future, that every *Century* of Years one *Bessextile Day* should be omitted, excepting only every 4*th Century*, which should retain the *Bissextile*, according to the common Custom.

CHAP. VII.

Of the Various Cycles, *and* Periods *of Years.*

NOt to insist long upon the Explaining the several *Epochs* of Time, It is enough to say that *Epochs* are certain *Heads*, or beginnings from whence Time is computed, and agreed upon amongst all *Chronologists*, as among the *Epochs* of the Old *Testament*, *Noahs Flood*, the *Jews deliverance from Bondage*, and the *Babilonish Captivity*; Amongst the *Christian Epochs*, the *Birth*, and *Passion* of our *Saviour*, the Destruction of *Jerusalem*, &c. Amongst those of the *Romans*, the Building of *Rome*; And amongst the *Greeks*, the Destruction of *Troy*, the *Olympiads*, the Death of *Alexander*, &c. Much of the same nature are the several *Areas*, as the *Area*, or *Hera* of the World, that is, the number of Years from the *Worlds Creation*; the Christian *Area*, or number of Years from the *Nativity* of our *Saviour*; also the *Hegira* of the *Arabians* from *Mahomet*.

The *Cycles* and *Periods* of Years are a certain number of Years Circuiting about, by which as so many Faithful *Guardians*, the *Series* of Times are preserved whole and entire: Famous amongst the *Greeks* were their *Olympiads*, which were every 5*th* Year, in which all sorts of *Games* and *Exercises* were performed. Amongst the *Romans* was their *Lustrum*, which was also the space of five Years, at the end of which time all *Tributes* and *Taxes* were paid; but in the Reign of *Constantine* the Great, the *Olympiads*, and *Lustres* being abrogated, the *Indiction* was put in the room thereof: This *Indiction* was the space of 15 Years, which was the time allotted to the Provinces of the *Roman Empire*, for the paying their Tributes; and the use of this *Indiction* is retained amongst the *Ecclesiastical Accounts*; Amongst the *Jews* there were two noted *Periods*, *viz.* the *Sabbarian Year*, that is, every 7*th* Year, in which the *Earth* was to rest from all manner of *Tillage*, in like manner as Man from all manner of dayly Labour on the 7*th* day of the Week. Secondly, the Year of *Jubile*, which was every 50 Years, at which time not only the *Earth* rested from *Tillage*; but all *Debts* were remitted, &c. There needs no more to be said of that which we call *Seculum*, but that it is the space of 100 years; nor of the *Acuum*, but that it may be properly said to contain 1000 years; as for the *Decennoval Circle* of the *Golden Number*, it hath been sufficiently Treated of, *Chap.* 5. There now remains only the *Cycle* of the *Epacts*, and the *Solar Cycle*.

I. The *Epact* is the *Series* of 11 days, by which space the *Lunar Year* is exceeded by the *Solar*; so that if this Year the *Epact* be 11, the next Year it will be 22, but the third Year not above 3; because that as often as by the Addition of several *Epacts* together, the number 30 shall come to be included in the sum of the said *Epacts*, 30 is to be taken away, and what remains is to be retained

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for the *Epact al Number* of the following Year; fo that every 3*d* Year in which the Thirties are caſt away, there happens an *Emboliſmical Moon*. Where note, that the *Epacts* always proceed by the *Addition* of the Number 11, till the *Golden Number* happens in its courſe to be 19, and then the Number 12 is added in the room of 11, for the *Epact* of the following Year, and therefore this *Cycle* is called, becauſe it is oftentime thus interrupted.

II. The *Solar Cycle*, or Circuit of Dominical Letters is a revolution of 28 Years, at the end whereof the ſame Order, or Combination of Letters returns as at firſt; for ſince it hath been ſaid before that the Series of Letters *A,B,C,D,E,F,G*, which repreſents the 7 *Feriæ*, or Days of the Week, are ſo diſpoſed in the *Calender* that the letter *A*, prefixt at the beginning of the Year, continueth on in the ſame capacity, and denotes the ſelf ſame Day of the Week to the Year's end, unleſs that the Year happen to be *Biſſextile*, the next Year in like manner *B*, and ſo forward in their order. The whole *Cycle*, or revolution of the 7 Letters would by this means be brought about, and finiſhed in 7 Years, if the *Biſſextile* Day did not obſtruct; for this being every 4*th* Year inſerted, and in the whole Series of Years 7 times coming about, though in a different manner, doth not happen in the ſame order of Letters, until all the 28 Years are compleated, as may be ſeen in the *Calender*; for it is called the *Solar Cycle*, becauſe it conſiſts of *Solar* Years, which being 4 times Multiplied upon 7, compleat that Number, and this *Cyle* according to the *Roman Cuſtom* begins from the *Biſſextile Year* which hath *F* for its Dominical Letter. Of all the ſorts of *Cycles* mentioned, the three moſt in uſe amongſt *Chronologiſts* are the *Decennoval Cycle* of the *Golden Number*, the *Solar Cycle* of 28 Years, and the *Cycle* of *Indiction* conſiſting of 15 Years.

The *Solar Cyle* being Multiplied by the *Decennoval Cycle* of the *Golden Number* produces the number 532, which is called the *Dionyſian Period*, from the Inventor thereof, *Dionyſius* ſirnamed *Exiguus*, who obſerved, that the revolution of theſe 532 Years brought about an exact conformity of the 3 *Cycles*, and conſequently by that the *New Moons* return not only to the ſame Days of the Year, but alſo the ſame Days of the Week, as they are noted in the *Calender*.

Hitherto may alſo be added the *Julian Period*, conſiſting of 7980 Years, which ariſeth from the Multiplication of the *Dionyſian Period* by 15, the number of Indiction; they call it the *Julian Period*, becauſe it is compoſed of the *Julian Year*, Multiplyed upon each other; and it is finiſh't of the ſame Conjugation, upon the return of the 3 *Cycles* of which it is compoſed; neither will the ſame Conjugation of the *Solar Cycle*, the *Golden Number*, and the *Indiction* ever happen again in any Year of this *Period*, until after the revolution of 7980 Years: For Example, it is to be ſuppoſed from the Doctrin of *Petarius*, that 3983 Years, of this *Period* had paſt from the *Creation* of the *World*, to the *Birth* of our *Saviour*, and that the *Chriſtian Area*, or firſt Year of *Chriſt* began with the Year of the *World* 3984; and that the *Solar Cycle* then 10, the *Lunar* or *Golden Number* 2, and the *Roman Indiction* 4, fell upon the firſt Year of *Chriſt*, as appears from the exact computation of them. For if in this preſent Year of *Chriſt* the *Cycle* of the *Sun* be 9, and of the *Moon* 10, as all *Mathematicians* agree; it follows, that thoſe above-mentioned were in the firſt Year.

Laſtly, It muſt be taken for granted, that thoſe three *Cycles* agree together in the Year of the *Julian Period* 4714; becauſe if this Number be divided by 28, which is the entire *Solar Cycle*, the Remainder from the *Diviſion* will be the Number 10; and by the ſame Reaſon, if afterwards the ſame Number of the *Julian Period* be divided by the *Cycle* 19, the Remainder will be 2; and if by 15, the *Cycle* of the *Indiction* 4.

Theſe things being firſt laid down, it follows, Firſt, That the firſt Year of *Chriſt*, which is ſuppoſed to be the Year of the *World* 3984, concurs with the Year of the *Julian Period* 4714. Whence obſerve, Secondly, That the Years of the *World* being ſubtracted from that Number, there remains out of the *Julian Period* the 730 Years which went before, and were co-exiſtent with no real Time, 731 Years of the *Julian Period* being paſt before the Creation of the *World*.

And thus we may underſtand what the true Reaſon is of the *Julian Period*, namely, that every Year thereof may have its proper *Cycles*, all which can be found in no other Year of the ſame *Period*.

CHAP. VIII.

Practical Examples of CHRONOLOGY.

To find the Solar Cycle *of any given Year.*

TO the Year of our *Lord* propounded, add 9; then divide the Sum added by 28, and the Remainder is the *Solar Circle* of the given Year: If nothing remains of the Diviſion, the Number of the *Solar Circle* is 28.

Note, That the *Quotient* in this Diviſion ſhews how many Revolutions of this *Circle* have been made from our *Saviours Nativity* to the Year propoſed.

'Tis further to be noted, That the *Number* 9 is therefore added, becauſe that our *Saviour* being Born in the 10*th* Year of this *Cycle*, 9 Years thereof had then paſt.

To find upon what Day of the Week, the firſt Day of any aſſigned Year ſhall fall.

DIvide the fore-going Year of *Chriſt* by 4; then add the *Quotient* to the Number divided, omitting the remainder of the *Diviſion*; from the Sum *Total* ſubtract 10, and then divide the reſidue by 7, and the Remainder from this *Diviſion* will be the Number ſought; or if there be no Remainder, then 7 it ſelf will be the Number. For Example, Let 1654 be the Year propoſed, the Year preceding being divided by 4, the *Quotient* will be 413, which being added to the divided Number, produceth 2066; but 10 being ſubtracted, 2056 is the remaining Number; which being divided by 7, hath 5 for its Remainder; ſhewing that the firſt Day of the ſaid Year is the fifth Day of the Week, *viz. Thurſday*.

To find the Dominical Letter of any given Year.

SUbtract the Day of the Week found by the former *Rule* from 9; for Example, 5 from 9 and there reſts 4, which Remainder ſhews, that the ſought Letter is the 4*th* amongſt the *Dominicals*, reckoning incluſively from *A*, whence it follows that *D*, is the *Dominical Letter* of the ſaid Year; for it may be taken for granted from what hath been ſaid before, that *A* is always affixed to the begining of the Year.

To find out the Biſſextile Year.

DIvide the given Year of *Chriſt* by 4, if nothing remains, then that Year it ſelf is it; or if any remain, then the ſaid remainder ſhews the Number of Years from the *Biſſextile*, both for the time paſt and that to come; for Example, from the *Diviſon* of the Year 1654 there reſts the Number 2, which ſhews that 2 Years before, that is 1652 was the laſt *Biſſextile*, and that 2 Years after, *viz.* 1656 will be the next.

The Year being given, to find the Number of the Roman Indiction.

TO the Year of our *Lord* propoſed add 3, becauſe it is determin'd that our *Saviour* was born in the 4*th* Year of this *Cycle*, ſo that conſequently 3 Years were then paſt. Now let the Number compoſed of the ſaid Year and added, be divided by 15, the Number left of the Diviſion will be the *Indiction* ſought; if nothing be left, conclude it to be the Year of the *Indiction* compleated, *viz.* 15, and the *Quotient* will ſhew how many revolutions of this *Cycle* have paſt until that given Year. For Example, in the Year 1654, the Year of the *Indiction* is 7, and there have paſt to this time 110 *Cycles* of the *Indiction*.

To find the Golden Number of the given Year.

TO the given Year of our *Lord* add 1, which Number divide by 19, the Remainder will be the *Golden Number* of the current Year; for Example, The given Year of our *Lord* being 654, the *Golden Number* will be 2.

To find the Epact of the given Year.

TO the *Golden Number*, which is ſuppoſed already found, and conſiſts of 3, or a compoſition of ſeveral *Threes*, add 20. The Sum, if it amount not to 30, or the Surpluſage if above, (for then the 30 muſt be caſt away) is the the *Epact* ſought. For Example, The *Golden Number* of the Year 1651 is 18, being a multiplicity of *Threes*, to which 20 added, makes 38; ſo that after the 30 caſt away, the remaining 8 is the *Epact* of the *Year*. Otherwiſe if the *Golden Number* ſhould be leſs by a Unite than 3, or a Compoſition of *Threes*, then add 10. and the Sum thereof will be the *Epact*; yet ſtill with a rejection of 30, when ever there is a Surpluſage of that Number. And thus in the Year 1654 the *Epact* is 12, but if the *Golden Number* chance to be greater by a Unite than 3, or a Compoſition of *Threes*, the *Golden Number* it ſelf will be the *Epact* ſought.

To find when it will be New-Moon in any given Month.

ADd the *Epact* of the Current Year to the Number of *Months* incluſively from *March*, and Subtract the *Product* thence ariſing from 30, or if it exceed that Number, then from 60, and the Remainder will ſhew the Day of the *Month* on which the *New Moon* happens. For Example, It is inquired on what Day of the *Month* of *Auguſt Anno* 1651 the *New Moon* was, ſuppoſe the *Epact* of that Year was 8, Add thereunto 6, the Number of *Months* from *March*, the Sum of both theſe Numbers will be 14; then Subtract from 30, and there remains 16; whence it is apparent, that the *New-Moon* of that *Month* was about the 16*th* Day.

To find the Age of the Moon on any Day given.

HAving from the foregoing *Problem* gained the *New-Moon*, if the given Day of the *Month* be after the *New-Moon*, reckon how many *Days* incluſively have paſt from thence; but if before, it will belong to the laſt part of the preceding *Moon*. For *Example*, If the *Age* of the *Moon* be ſought on the 24*th* of *Auguſt* in the *Year* 1651, in which the *New-Moon* is found to fall on the 16*th Day*, by conſequence it may be concluded, that ſhe was 9 *Days Old*; but if it be ſought on the 8*th* of *Auguſt*, it was on the 22 of the *Moon* preceding; upon this *Hypotheſis*, that 30 *Days* are attributed to the *Moon*; for if from 30 you *Subtract* the *Days* numbred from the *New-Moon* found, and conſequently from the end of that preceding *Moon* which is found to be 8, there remains 22.

There is another Vulgar way of finding the *Age* of the *Moon*. Add together theſe 3 Numbers, the proper Epact of the *Year*, the Number of *Months* incluſively from *March* to the given *Month*; and laſtly the given *Day* of that *Month*. If the *Sum* of theſe Numbers added be under 30, it ſhews the *Age* of the *Moon*; if above 30, then

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then *Subtract* 30 from it, and the Remainder will be the *Age* of the *Moon* fought.

Note, That when the *Age* of the *Moon* is fought in the *Month* of *January*, or *March*, nothing is to be added to the *Epact*, but the *Day* of the *Month*, and that only 1 is to be added for the *Month* of *March*, and *April*. But remember, that that *Epact* begins from *January*.

The Age of the Moon being known, to assign its place in the Zodiack.

SUppose that on the 31*th* of *October* the *Sun* be in the 8*th* Deg. of *Scorpion*, and that the *Moon* be at that time 16 *Days Old*, and consequently that 16 *Days* before she was in Conjunction with the *Sun* in the 23*th* Degree of *Libra*; and lastly that the *Moon* in one diurnal Circuit passeth through very near 16 *Degrees* of the *Zodiack*: Hereupon multiply those 16 *Days* by the 13 *Degrees*, and the *Product* will shew how many *Degrees* she is distant from the *Sun*; then by reckoning the *Degrees* which the *Sun* hath finish'd at that time, and knowing how many *Degrees* the *Moon* hath departed from the *Sun*, it may consequently be collected in what *Sign* the *Moon* is, and in what *Degree* of the *Sign*, since every *Sign* contains 30 *Degrees*. Or thus, multiply the Age of the *Moon* by 4, and again the *Product* of this *Multiplication* by 3, and you will have the Number of *Degrees* of the *Moons* distance from the *Sun*.

Note, That the *Moon* departs every Day farther and farther from the *Sun* about $\frac{1}{2}$ of an *Hour*; so that if she riseth to Day with the *Sun*, to Morrow she riseth not till $\frac{1}{2}$ of an *Hour* after.

To find the Paschal Moon *of any given Year.*

SEek in the *Gregorian Calender*, from the 8*th* of *March* to the 5*th* of *April*, for the *Epact* of the Year current, and that will shew that the *New-Noon* is on such or such a Day; then reckon 14 Days from thence, which done, seek the *Dominical Letter*, which follows next after the said 14*th* Day; and hereby the true Time of the *Feast* of *Easter* is known.

Note, That these *Moons* only which begin at the 8*th* of *March*, and end at the 5*th* of *April*, can become *Paschal*, and consequently that *Easter* can't fall sooner than the 22*th* of *March*, since the 14*th* Day of the *Moon* falls upon the 21*th* of *March*, and the Day following is the *Dominical*, or *Lords Day*, which is *Sunday*. But neither on the other side can *Easter* fall later than the 25*th* of *April*, and consequently, it is also to be observed, that a *March Moon*, that is, wholly within the Month, can never become *Paschal*, since (as it hath been already observed,) the *Moon* is only attributed to that Month in which it ends; but the *Paschal Moon* always ends out of the Month of *March*; whence it follows, that a *March-Moon* can never be *Paschal*; or a *Moon* of the first *Month*, according to the *Jews*, and the Decree of the *Nicene Council*.

The time of the Day, or Night being given, to find what a Clock it is.

FIrst, Let the *Suns* Elevation above the *Horizon* be known, and the *Degrees* of the *Zodiack*, which the *Sun* or *Moon* possesseth, be rightly disposed in the *Circle* of the Elevation; then apply the *Ostensor* to that *Deg.* or part of the *Zodiack*, according to the *Line* of Direction, which upon the *Limbo* will point to the *Hour* sought; that is, if in the East-part, the *Antimeridian*, or *Forenoon-Hours*; if in the Western-part, the *Pomeridian*, or *Afternoon-Hour*.

Where Note, That *Equal*, or *Equinoctial Hours* are here treated of; for if an *Unequal*, or *Temporary-Hour* be sought, the *Ostensor* is applied to the part opposite to the *Sun*, or to the opposite *Sign* and *Degree* in the *Zodiack*; the lower part of the *Ostensor* will denote the *Unequal*.

To find the Rising, and Setting of the Sun; *and consequently the quantity of the* Artificial Day, *at any time of the Year.*

PLace the *Part*, or *Degree* of the *Sun*, found by the *Astrolabe*, on the Eastern part of the *Horizon*; then set the *Ostensor* to that part of the *Sun*, and it shews the sought Hour of the *Suns-Rising*. In like manner the Hour of the *Suns-Setting*, is to be found by transferring that of the *Zodiack* where the *Sun* is to the Western *Horizon*.

The same is also done by the *Globe*, or *Armillary Sphære*, by applying that part of the *Ecliptick* where the *Sun* is, to the *Meridian-Circle*, and at the same time putting the *Horary Index* upon the *Meridian-Hour*; and lastly, turning that part of the *Zodiack* Eastward, till it exactly answer the *Horizon*, and then the *Horary-Index* will shew at what *Hour* the *Sun* Riseth: In like manner answerably for finding the *Hour* of the *Suns-setting*.

Of the Morning and Evening Crepusele, *or* Twilight.

THe Morning *Crepuscle* begins when the *Sun* comes within 18 *Degrees* of the *Horizon*, towards his Rising in the Morning; the Evening *Crepuscle* ends when the *Sun* Setting is gone 18 *Degrees* beneath the *Horizon*. To find the *Hour* of this *Crepuscle*, turn the *Globe* so about, that that part of the *Ecliptick* where the *Sun* is, may fall 18 *Degrees* beneath the *Horizon*, and then the *Horary-Circle* will declare the sought *Hour*; and so the opposite part being Elevated 18 *Degrees* above the *Horizon*, proves that the *Sun* at the same time is descended 18 *Degrees* beneath, as will appear by numbring those *Degrees* upon the *Æquator*.

To

To know what A-Clock it is in any part of the World.

THis will easily be found by the help of the *Terrestrial Globe*; the *Hour* being first known of those *Regions* which lye under your *Meridian*, by moving that *Meridian*, and directly applying it to the immoveable *Meridian* of your *Instrument*, and placing the *Horary-Index* at such or such an *Hour*; then upon turning about the *Globe*, the Immoveable *Meridian* will point out those *Regions*, whose *Hour* desired is shewn in the *Horary-Index*.

First, It is to be noted, for the unfolding of several *Problems* of this nature, That the *Earth* is daily surrounded by the *Sun*, who in that *Quotidian* Course passeth through a multitude of *Meridians*, successively one after another; so that he must visit every *Hour*, 15 *Meridians*, according to the Account of 365, being divided by 24. Moreover, It must be allowed, that in every *Country* there is a *Mid-day*, or *Noon*, when the *Sun* makes its *Circle*, which is thence called the *Meridian-Hour*, the very midst of the said place, and consequently, that every 15 *Meridians* he passeth through, so many *Hours* he makes; and that the *Sun* makes at the same time both the same *Hours*, and also both new *Hours* and *Seasons* respectively, according to the several *Countries* and *Regions* he passeth through; whence it may well enough be affirmed, That that very moment there is at one and the same time every *Hour* and every Season of the *Year* throughout the several *Countries* of the World, in so much that every *Hour* of the day perpetually circuits round about the *Earth*, &c. Suppose therefore, that to a man resting under the same *Meridian* there is alwaies a natural Day of 24 Hours, because there must needs be such a space of Time before the *Sun* can return again to the same *Meridian*.

Note also, That to a *Man* journying Eastwards, the Day is less than 24 Hours: for the *Sun* will be sooner in that *Meridian* in which he is to meet him, than in that from whence he departed. On the contrary, to one that makes a *Journey* Westwards, the Day becomes more than 24 Hours, because the *Sun* will sooner reach the *Meridian* from whence the Person departed, than to overtake the Person departing: Wherefore, Note in the last place, That it may so happen that two *Ships* setting forth from the same *Port*, the one Eastwards, and the other Westwards, yet at length may meet in some part of the World. In like manner, Admit *Peter* go hence Eastward, and *Paul* at the same time Westward, and both of them having surrounded in their Travels the World, after some Years, return on the same Week to *John*, who remains all this while at Home; it may happen that although every one of them observe the same way of counting the Time, yet *John* may reckon *Tuesday*; *Peter*, *Wednesday*; and *Paul*, *Munday*; then the next day after *Peter* may have *Thursday*, *John Wednesday*, and *Paul*, *Tuesday*; lastly on the day following, *Peter* may reckon *Fryday*, *John Thursday*, and *Paul Wednesday*, and so of the rest; so that in one and the same Week in reference to 3 Men, *Thursday* will be thrice reckoned.

Hence comes the Solution of a common *Paradox*, maintaining, That it may so happen that two *Brothers* born at the same time, shall also dye together, and yet one live longer than the other, because he hath numbred more Days.

HISTORY.

AS the antient *Philosophers* have very properly defined Time to be *Mensura Motus*, the Measure of Motion; so *History* may not unfitly be defined *Mensura Temporis*, the Measure of Time: But to give a more exact Definition, *History* is the written Account of Memorable Things transacted, and of Persons transacting, from the Creation of the *World* to this time. It is by *Cicero* more Elegantly and Rhetorically styl'd *Testis Temporis*, *Lux veritatis*, *Vitæ Memoriæ*, *Domina Vitæ*, *Nuncius Antiquitatis*, &c. *The witness of Time, the Light of Truth, the Life of Memory, the Mistress of Life, and the Messenger of Antiquity.*

The Division of *History* is according to many Authors, threefold, *viz. Ecclesiastical*, and *Prophane*; *Antient*, and *Modern*; and *Universal* and *Particular*: But since there is no Essential difference between *Antient* and *Modern*, I shall only make use of a twofold Division, *viz.* First into *Ecclesiastical* and *Prophane*; next into *Universal* and *Particular*; the last of which is included in each Branch of the First, that is to say, both *Ecclesiastical* and *Prophane*, is subdivided into *General* and *Particular*.

Ecclesiastical History is that which treats most *Peculiarly* of the Affairs of the *Church*, that is, of the administration of Affairs by persons who profess an *Ecclesiastical Function*.

The First, and principal part of *Ecclesiastical History*, is that of the *Holy Scriptures viz.* the *Old* and *New-Testament*; The *Old Testament* contains the Creation of the *World*, the Transgression and fall of *Adam*, the universal *Deluge*, the repeopling

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of the *World*, by the Sons of *Noah*, the Off-spring of *Abraham*, multiplyed according to Gods Promiſe from the 12. *Tribes* of *Iſrael*, into a numerous People; Gods deliverance of the Children of *Iſrael*, by the Hands of *Moſes* and *Aaron*, from the *Ægyptian* Bondage; Their ſlow Marches, and long Sojourning in the *Wilderneſs*; Their ſeveral *Victories* under *Joſhua*, and the reſt of their *Judges*, until that compleat Conqueſt of the Land of *Canaan*; The riſe of their Kingdom under *Saul*; the progreſs thereof under *David* and *Solomon*; the Diviſion thereof into two diſtinct Kingdoms, *viz.* of *Judah* and *Iſrael*, with the double Race of Kings from *Rehoboam* King of *Judah*, and *Jeroboam* King of *Iſrael*, to the *Aſſyrian*, and *Babyloniſh Captivity*; The return of the *Jews* from *Captivity*; The rebuilding of the *Temple*, and of the *Walls* of *Jeruſalem*, by the Intereſt of *Ezra*, and *Nehemiah*, with the Kings of *Perſia*.

The *New Teſtament* contains the *Incarnation* and *Nativity* of *Jeſus Chriſt*; The Addreſs of the *Eaſtern Magi* to Him with their Preſents; His conveyance into *Ægypt* from *Herods Tyranny*; *John* the *Baptiſts Preaching*, *Baptiſm* and *Execution*; *Chriſt's Temptation* by *Satan* in the *Wilderneſs*, and his Conqueſt over him; His diſputation in the *Temple*, his *Preaching* to the *Multitude* and his *Diſciples*; his ſeveral *Miracles*; his laſt *Supper*; His apprehenſion through the Treachery of *Judas*; His *Trial*, *Crucifixion* and *Reſurrection*; His appearing amongſt his *Diſciples* after his *Reſurrection*; His *Aſcenſion* into *Heaven*, and his ſending down the *Holy Ghoſt* upon the *Apoſtles* in cloven *Tongues*; the firſt planting of the *Chriſtian Religion* by the *Preaching*, *Sufferings*, *Miracles* and *Writings* of St. *Peter*, St. *Paul*, after his Converſion, and other *Apoſtles*, and *Miniſters* of the *Goſpel*.

The reſt of the *Eccleſiaſtical Hiſtory* continuing from the time where the *Holy Scriptures* end, contains all matters relating to the State of *Chriſtianity* from that time until this: The antient *Fathers* what Times they flouriſhed, with an Account of their *Writings*: The Exemplary Lives of the Primitive *Chriſtians*, and their patient ſuffering under the *Ethnick Roman Emperours*, particularly the Ten cruel Perſecutions, firſt under *Nero*, laſtly under *Dioclefian*; The *Chriſtian Faith* firſt openly profeſs'd, and aſſerted by *Conſtantine* the Great in the Year of our Lord 306: The Succeſſion of the *Popes* of *Rome*, from *Linus* to this preſent *Innocent* the 11th; The Tranſactions of the 20 *General Councils* from the firſt *General Council* at *Nice*, *Anno* 318, to the *Council* of *Trent*, *Anno* 1563; The Conteſt betwixt the *Catholicks* of the *Latin*, and the *Arrians* of the *Greek Church*, as alſo about *Image-Worſhip*; The firſt Commencement of the Biſhop of *Romes* claymingSupremacy over all the reſt of the *Chriſtian Biſhops*, and *Patriarchs* in the time of the Uſurping *Emperour Phocas*, *Anno* 601. The 26 *ſeditipapal* Schiſms or Factions of one *Pope* ſetting up againſt another from *Novatianus* againſt *Cornelius*, *Anno* 255, to *Felix* againſt *Eugenius*, *Anno* 1439. The Reformation of Religion in *England*, *Germany*, *Denmark*, *Sweden*, *Switzerland*, part of *France*, and elſe where in *Europe*; and the great Animoſities betwixt thoſe of the *Romiſh-Party*, and thoſe of the *Reformation*.

Prophane Hiſtory contains the various *Accidents*, *Events* and *Occurrences* in the *World* in Secular Matters; The *Acts* and *Deſigns* of eminent *Men*, whether good or bad, both in Peace and War; The ſtrange alterations and viciſſitudes of human *Affairs*; The Fall and decay of *Empires*, *Kingdomes* and *States*, with the riſe, and growth of others.

All our late Writers of univerſal *Hiſtory* agree in this one Method, that is, of carrying on the main ſtream, or current thereof through the 4 chief *Empires*, or, as ſome call them, *Monarchies* of the *World*, viz. the *Aſſyrian*, *Perſian*, *Grecian* and *Roman*.

The *Aſſyrian Monarchy* or *Empire*, which may alſo be called the *Babilonian*, in regard the chief Seat of the *Empire* was for the moſt part at *Babilon*, until the *Empire* came to be divided into a double *Empire*, *viz.* that of the *Babilonians*, and that of the *Medes*, which was begun by *Belus*, vulgarly called *Jupiter Belus*, and is thought by many to be the ſame with *Nimrod* mentioned in *Holy Scripture*; others account *Ninus* the Son of the ſaid *Belus*, to be the firſt *Aſſyrian Monarch*; however there are named, (and for the moſt part only named) about 37 *Monarchs* from the otiginal thereof to *Sardanapalus*, who being totally overthrown, by his two Vice-Roys *Beloch* of *Aſſyria* and *Arbaces* of *Media*, the *Empire* was divided, and there Sprung up a double Race of Kings, *viz.* of *Babilon* from *Belochus*, and of *Media* from *Arbaces*. The laſt of this *Median* Race was, *Aſtiages*, whoſe Grand-Child *Cyrus* by the Daughter of *Mandana* a *Perſian* by the Fathers ſide, got the Kingdom from his Grand-Father, and United the *Perſian*, and *Medes* into one *Empire*.

This Grand Monarchy began about the Year of the World 1820. contemporary with which was, firſt the *Sicyonian* Kingdom, much of the ſame origen begun by *Ægialus*; next the *Argive* Kingdom begun, *Anno Mundi* 2100, by *Inachus*, whence deſcended the family of the *Inachidæ*, after whom ſucceeded the *Dardanidæ*, and laſtly the *Mycenæans*. The Kingdom of *Athens*, began by *Cecrops*, *Anno Mundi* 2426, and of *Lacedæmon* by *Leles* about the Year 1500, The antient Kings of *Latium* from *Janus*, *Anno Mundi* 2700, and after them of the *Silvian* Race from *Æneas*, *Anno* 2803; and after them the *Roman* Kings from *Romulus*, *Anno* 3231, to *Tarquinius Superbus*, *Anno* 3446. The Kings of *Troy* from *Dardanus*, *Anno* 2600, to King *Priamus*, in whoſe time, *Troy* was Burnt and Sack't by the *Greeks*. The *Corinthian* Kingdom from *Siſyphus*, *Anno* 2573. The antient *Macedonian* Kings from *Caranus*, *Anno* 3170.

The ſecond Grand *Empire* called the *Perſian Monarchy*, was begun by *Cyrus*, *Anno* 3425, and renewed the more potent by the Addition of the *Median* Kingdom, which he got by conqueſt from his Grandfather *Aſtiages*, as before mentioned. The *Empire* laſted not very many Ages, for it was not much more than 250 Years from its firſt Rife, before it was brought to a *Period* by the Conqueſt of *Alexander*, Son of King *Philip* of *Macedon*, commonly ſirnamed the Great. Contemporary with this *Monarchy*, were the Great and Noble Actions of the *Athenian* and *Spartan* Common-Wealth. The Original of the *Roman Republick*, after the Expulſion of their Kings, *Anno Mundi* 3475, under the Annual Government of *Conſuls*, and Victorious Progreſs thereof.

The third *Pancraſtick* Dominion, called the *Greek Empire*, is liable to ſome diſpute as to its Exiſtence, Original, and Duration; for the heighth of the *Grecian* Glory, and ſucceſs was under the *Athenians*, and *Lacedemonians*; but theſe two People being in thoſe days both Republick, the time of their Flouriſhing could not properly be ſaid to be one of the ſaid *Monarchies*; beſides in their higheſt pitch of their Glory and Grandure, they were Contemporary with the *Perſian Monarchy*, to which at firſt they were a Terror, afterwards by turns, an Aid and Aſſiſtance againſt each others dreaded Power; whereas all the 4 *Empires* muſt needs be reckoned each Succeſſive to the other; ſo that we may juſtly reckon this *Greek Monarchy* to be a mighty Blaſe of an *Empire*, riſing out of the *Macedonian* Kingdom; being raiſed to its heighth of Splendor, by the Great Succeſs of King *Philip*, who ſubdued the reſt of *Greece*, and the great Succeſs of his Son *Alexander*, who about the Year 3650 and odd, with a ſmall *Army* quickly overthrew the whole Power of *Perſia*, and carried Terror to the remoteſt parts of the *Eaſtern* World; but the Pride of this Great *Conqueror* was ſoon laid low, and ſmall was the fruit he Reap't of all his mighty Conqueſt; for he was taken out of this Life in the Flower of his Age, and both his Paternal and ſubdued Dominions parcelled out into ſeveral Kingdoms and Principalities, by his Succeſſors the Grand *Captains* of his *Army*, the chief whereof were, Firſt, the Remnant of the *Macedonian Monarchy*, from *Caſſander* the Son of *Antipater*, *Anno Mundi* 3663, or thereabouts, to *Perſeus* who was overcome by the *Romans*, *Anno* 3816. Secondly, The Race of the *Ptolemies* in *Egypt*, from *Ptolemæus Lagi*, *Anno Mundi* 3660, or thereabouts, to *Cleopatra* the Siſter of *Ptolemæus Bacchus*, and Miſtreſs of the great Roman Captain *Marcus Antonius*, with whom ſhe died, to avoid being carried in *Triumph* to *Rome*, *Anno Mundi* 3954. Thirdly, The Kingdom of *Syria* from *Seleucus Nicanor*, *Anno* 1672, to *Antiochus*, 12th Son of *Euſebes*, Sirnamed the *Aſian*, *Anno* 3718. Contemporary with this Renowned, but ſhort liv'd *Monarchy*, was the growing greatneſs of the *Romans*, under their Conſular Government, during thoſe above mentioned *Dynaſtys*, which Sprung out of the *Greek*, or *Macedonian Empire*. The moſt noted Kingdom beſides, was that of *Pergamus* in *Aſia*, from *Phileratus* the *Eunuch*, *Anno* 3700, to *Attalus* Son of *Eumeches*, who dying, made the Common-Wealth of *Rome* his Heir.

The 4th and laſt great *Predominant* Power of the World, the Greateſt without all doubt of all the reſt, and of the longeſt continuance by far, eſpecially ſince to this day (in Name and Title at leaſt) it remains in being, is called the *Roman Empire*; for it may very well deſerve the name of an *Empire*, long before it could be called a *Monarchy*; which was not until the *Cæſars* had wreſted the Supream Power from the *Senate* of *Rome*, and aſſumed the Title *Imperator*, attended with *Regal* Authority and Dignity; whereas *Romes* Dominions were extended to their utmoſt Bounds, under the Influence of a *Common Wealth*; and *Julius* was but the *Senates* Servant when he Conquered *Gallia*, and a great part of *Germany*; however ſince our Writers of Univerſal *Hiſtory*, have for the moſt part thought fit to commence that *Roman Empire* from its *Imperial Monarchy*, it will be convenient to ſubſcribe to the general Opinion, both as to the beginning, and continuance thereof; by which it will appear, that the greateſt part of the *Roman Empire* by far hath been Excluded out of *Rome*, having undergon ſuch an *Alteration*, and ſuch a *Tranſplantation* from one Seat to another, as no other *Monarchy* beſide, either before, or ſince. From *Julius Cæſar*, to *Conſtantine*, *Rome* was the Seat, which was about 350 Years, and in that time it ſuffered much of Alteration and Diminution. The choice of the *Emperour* was all this while, and for the moſt part long after, at the *Armies* pleaſure; and it remained in the *Julian Race* but till *Coccius Nerva*. *Conſtantine* the Great, the firſt *Chriſtian Emperor*, at leaſt that openly profeſs't himſelf ſo, removed the Seat of the *Empire* from *Rome*, to a new City of his own building upon the *Thracian Coaſt*, called from thence *Conſtantinople*, or *Conſtantines City*; ſo it continued till the time of *Theodoſius*, Sirnamed the Great, who divided the *Empire* betweeen two Sons, *Arcadius*, and *Honorius*, whence Sprung a double Race of *Emperours*, *viz.* the *Eaſtern* of the Line of *Arcadius*, Reigning at *Conſtantinople*, and the *Weſtern* of the Line of *Honorius* Reigning at *Rome*; but this *Weſtern Empire* was ſoon brought to a *Period* by the incurſion of the *Goths*, *Huns*, and *Vandals* into *Italy*. Three times in one Age was *Rome* taken, and ſack't by theſe *Invaders*, but the third time it was taken, *viz.* in the Year of our Lord 475, by *Odoacer* King of the *Heruli*, the Imperial Line was Totally Expelled *Rome*, and ſhortly after a new Kingdom erected by the *Goths* in *Italy*. Thus *Rome* which had been the Miſtreſs of the World for ſo many Ages, and the Seat till of late of the greateſt *Monarchs* of the World; had now loſt all its Glory, and become a common City; but that it ſeems it was from its firſt Foundation to the Worlds end, deſigned for an *Empire* in ſome ſort or other; and now a greater *Empire* ſeems to attend it, by how much the *Spiritual Sword* aws more than the *Temporal*, for not long after the time now mentioned, the Biſhop of *Rome* began to claim Superiority over all other Biſhops; and by that means hath ever ſince kept under his Obedience and Subjection all the *Princes* and *Potentates* of *Europe* (ſome few only excepted ſince the Reformation) more than ever any *Emperour* kept the leſſer Kings his *Tributaries*. The *Empire* thus overthrown, however the *Eaſtern Emperour* kept a kind of *Vice-Roy* in *Italy*, with the Name of *Exarch*, who held his chief Seat at *Ravenna*. In this Eſtate continued the Succeſſion of the *Eaſtern Emperors*; till *Charles* Sirnamed the Great of *France* had the Title of *Roman Emperor* given him by *Pope Leo* the Third, for the Aid given his Succeſſor *Adrian*, againſt the *Exarchs* of *Ravenna*, and *Deſiderius* King of the *Longo-*

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Longobards; so that a new *Roman Empire* was raised again in the *West*, if it may be truly stiled a *Roman Empire*; which neither had its Seat at *Rome*, nor any continual claim from the first *Roman Emperors*, but was only grounded upon a Title given by a *Pope* of *Rome* to a *French* King. For some Ages the *Imperial* Title continued to the Successor of *Charles* the Great, and had residence sometimes in *France*, and sometimes in *Germany*; but from the time of *Henricus Anceps*, to this present *Leopoldus Ignatius*, the *Imperial Seat* hath been continually in *Germany*. From the *Inauguration* of *Charles* the Great, to the time of *Frederick* of *Habspurg*, there still remained a *Series* of *Eastern Emperors* at *Constantinople*, so that all this while, namely for the space of about 650 Years, there was again a double Succession of *Roman Emperors*, *Eastern* and *Western*, though the truth is, which cannot be well understood how either of them could pretend to much more than a bare name, or Title of *Roman Emperours*, excepting that the *Constantinople* Succession was more clearly Built upon the Old Foundation; since all the vast Bulk of the Old *Roman Conquest* was fall'n in piecemeal, and was now almost reduced to nothing; so that no wonder the rising Greatness of the *Ottoman*, so easily overpowr'd the fallen greatness of the *Roman*. It was in the Year of our Lord 1453, that *Constantinople* was taken by *Mahomet* the First, and *Constantine* the *Emperour*, Son of *Joannes Emanuelis* Slain. In a *Constantine* this *Dynastie* began, and in a *Constantine* it ended; and with it according to the Opinion of some, all that can rightly be stiled the *Roman Empire*, the *Ottoman* power succeeding as a Fifth *Monarchy* in the room thereof.

Contemporary with this great *Roman* Power, and Name, have been several other great *Kingdoms*, *States*, and *Principalities*, namely, with the virile Age of the *Common-wealth*: The Kingdoms of *Pontus* and *Bithynia*, and the Remnant of the *Macedonian* and *Syrian* Kings, all subdued by the *Romans*; Great *Mithridates* of *Pontus*, *Perseus* of *Macedon*; and *Antiochus* of *Syria*: The *Carthaginian Common-wealth*, subdued also by the *Romans*, after the total Overthrow and destruction of *Hannibal*: The Kingdom of *Mauritania*, and *Numidia* in *Africa*; the later overthrown by the *Romans* after the Vanquishing of *Jugurth*; with the Western and Eastern *Roman Emperors*, from first to last. The several Successions of the *Persian Kings*, *viz.* the *Arsacidæ*, or *Parthian Race*: The *Persian Line* restored, the *Saracens*, the *Tartars*, the *Armenian Turks*, and of late years the *Sophies*, with the Successors of *Constantine*. The Kingdom of the *Goths* erected in *Italy*, from *Theodorick* to *Tejas*; afterwards of the *Longobards*, from *Alhovin* to *Desiderius*, *Anno Dom.* 774. The *Merovingian* Race of Kings in *France*, from *Pharamond* (*Anno Dom.* 400) to *Childerick* the Third, *Anno Dom.* 750, or thereabouts. The *Visigoths* in *Spain*, from *Athaulphus* the Brother of *Alaricus*, *Anno Dom.* 415, to *Alphonsus* the *Second*, *Anno Dom.* 800. The *Saxon Heptarchy* in *England*, from *Hengist* King of *Kent*, *Anno Dom.* 457, to *Crida* King of the *Mercians*, *Anno* 1626. The Ancient Kings of *Scotland*, from *Fergus*, *Anno Dom.* 422, to *Achajus*, about the Year 800. The *Vandals* in *Africa*, from *Geiserick*, *Anno Dom.* 427, to *Gilimer*, taken Prisoner by *Belisarius*, *Anno* 534; and after them the *Sarazens*. The beginning of the *Venetian Commonwealth*; with the *Western Empire*, entituled from *Charles* the *Great*, the Successors of the said *Charles*, who from him had the Imperial Title themselves; and after them the other Line of *French* Kings, from *Hugo Capet*, *Anno Dom.* 987, to this present King *Lewis* the 14*th*. The Remainder of the said Succession of the Kings of *Spain*, from *Ramirus* the First (about the Year 800) to this present *Charles* the Second. The *Saxon Monarchy* in *England*, from King *Egbert*, *Anno Dom.* 800, or thereabouts, to King *Harald*, *Anno* 1066; and after that the Succession of the Kings of *England*, from the *Norman Conquest* by Duke *William*, to His present Majesty King *James* the Second. The Remainder of the *Dynasty* of *Scotland*, from *Achajus* to his present Majesty King *James* the Fifth of *Scotland*, and Second of *England*. The Remainder of the *Dynasty*, the Kings of *Spain* from *Alphonsus* the Second, *Anno* 800, to this present King *Charles* the Second. The King of *Denmark*. The Kingdom of *Portugal*, as taken out of the rest of *Spain*, from *Henricus Burgundus* (*Anno* 1090) to the present King. Not to mention the Kingdoms of *Denmark* and *Sweden*; the several States and Principalities of *Italy*, since the decay of the *Roman Monarchy* there, as the *Common-wealths* of *Venice*, *Genoua*, *&c.* The Dutchies of *Ferrara*, *Parma*, and *Placenza*, *Modena*, *Mantua*, *Savoy*, the Kingdom of *Naples*, which with the Dutchy of *Milan* is now under *Spain*; And the Dukedom of *Florence*. Thus you have a general view of *History* from the *Creation* to this present Time, as far as Brevity required will allow.

OPTICKS.

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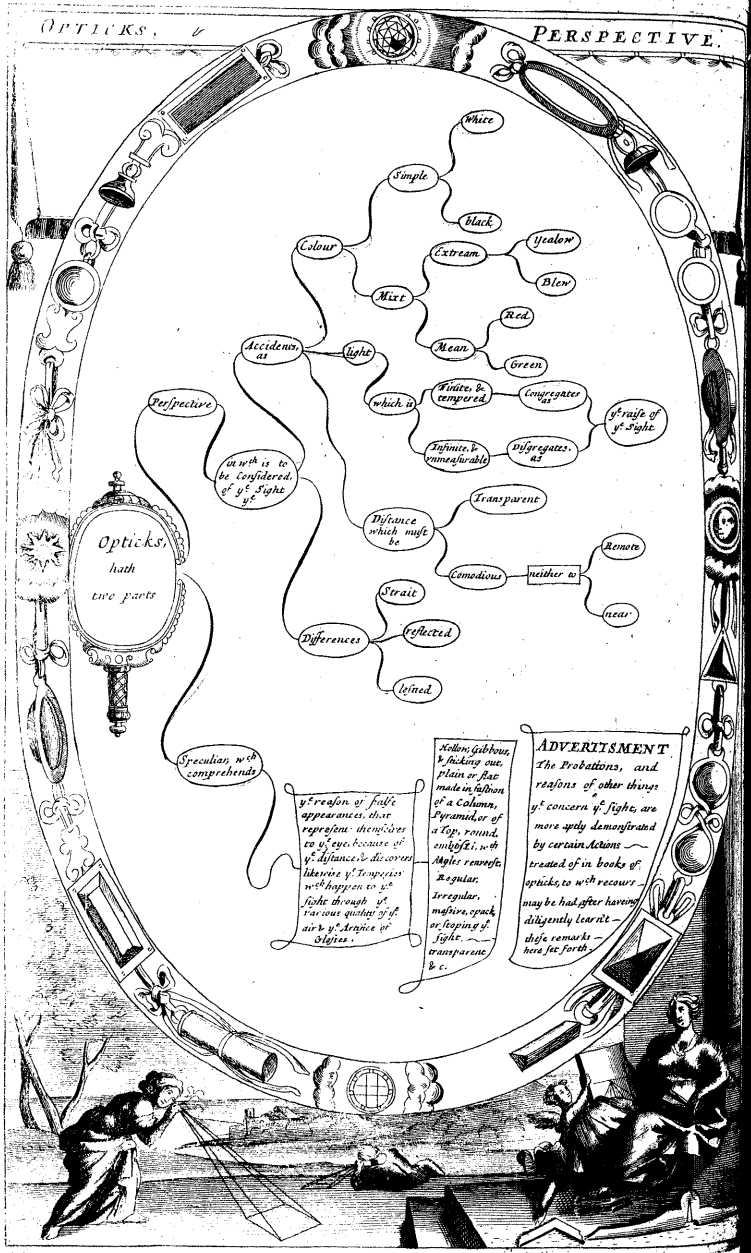
Opticks hath two parts
Perspective
Speculum, wch comprehends
Colour
Simple
White
Black
Mixt
Yealow
Extream
Blew
Red
Mean
Green
Accidents of light
which is
Finite & tempered
Congregates
Infinite & immeasurable
Disgregates
ye raise of ye Sight
wch is to be considered of ye Sight
Transparent
Distance which must be
Comodious
neither to
Remote
near
Differences
Strait
reflected
lessned
ye reason of false appearances, that represent themselves to ye eye, because of ye distance & discovers likewise ye Temples wch happen to ye sight through ye various quality of ye air & ye Artifice of Glasses.
Hollow; Gibbous, & sticking out, plain or flat made in fashion of a Column, Pyramid, or of a Top, round, emblisht, with Angles removed, Regular, Irregular, massive, opack, or leaping ye sight. transparent &c.
ADVERTISMENT
The Probations, and reasons of other things ye concern ye Sight, are more aptly demonstrated by certain Actions treated of in books of opticks, to wch recours may be had after having diligently learn't these remarks here set forth.

OPTICKS.

THE *OPTICK* is an Art of Judging well at *Sight*, which has two Parts, *viz. Perspective* and *Specular*.

Perspective is the first and principal part of the *Opticks*, which teacheth Nature, and the projection of the Rays of the *Sight*, *Colours*, *Lights*, and *Forms*.

It teacheth likwise to Judge rightly of the *Situation*, *Greatness*, *Interval*, and *Distance* of all things visible.

The *Sight* is a Sense, by which *Colours* are represented and known by a transparent and proper Interval.

Colour is an Accident of a Superficies, which is the proper Subject of the *Sight*, and is *Simple*, and *Compounded*.

A *Simple*, or *Primary Colour*, is the proper Subject of the *Sight*, which has but only one temperament, as *Black*, and *White*; the definition of which two *Colours* is made by the difference.

White is a *Colour* which is neareſt to *Light*; *Black*, neareſt to *Darkneſs*.

Of theſe two *Colours* all the reſt are compounded.

Compounded, or *Mixed Colour*, is called the proper Subject of the *Sight*, which hath divers temperaments; and is divided into an *Extream* and *Mean*.

An *Extream Colour* is that which approaches Neareſt to the *Simple*, which is again Subdivided into *Tellow* and *Blue*.

Tellow is a *Colour* approaches neareſt to *White*, and to the *Light*; *Blue* is neareſt to *Black*, and to *Darkneſs*.

Blue, which is called *Verditer*, is only *Blue* waſh'd, as *Tellow* is nothing but *Tellow* waſh'd.

Tellow therefore is a *Colour* compounded of *Simples*, in which there is even more of *Light*, and ſo *Blue*, in which there is already more *Darkneſs*.

Tellow, which is called *Gold Colour*, is that which comes neare to *Light*.

The *Mean Colours* between the two Extreams, are *Red*, and *Green*.

A *Mean Colour* is the proper Subject of the *Sight*, and is made of the Compounded.

Red is a *Mean Colour*, made of the Compounded, in which there is always more of *Light*; it is properly that *Colour* which is ſeen in the *Flames* of *Fire*. *Earthly Bodies* ſeem to look *Red*, if at any time they receive *Light*; but *Watery Bodies* ſeem of a *Purple Colour*.

Purple Colour is properly that which is ſeen in the *Waters*; It is not a *Violet Colour*, although it ſeems near it; but it is Compounded of *Light*, which is mingled with a Maſs of *Blue*, becauſe the greater clearneſs makes the *Blue* to appear as it were *Red*.

Green is alſo a *Mean Colour* made of *Tellow* and *Blue*, in which there is always more of the *Blue*. Let this ſuffice for *Colours*, being more at large treated of in *Painting*.

Light is a Splendour which flies *Darkneſs*: The true and proper *Light* is the *Sun*, being called the *Fountain of Light*: other *Lights* proceed, and are borrowed from that of the *Sun*: That *Philoſophers* ſay, that the *Celeſtial Luminaries* borrow their *Light* from the *Sun*; but ſince this *Light* is not Infinite where it is not, and when it is departed, *Darkneſs* follows, which is nothing elſe but the Privation of *Light*.

Now let us ſay ſomething of the *Interval*, of which there hath been already ſomething ſaid, which ought to be commodious and tranſparent.

An *Interval*, is a *Diſtance* from the *Eye* to the thing that it *Sees*: no Body can *See* ſo well without a commodious and tranſparent *Diſtance*; What we call commodious, ought neither to be too long, nor too ſhort; but a temperate and tranſparent *Clearneſs* is requiſite to ſpread the *Rays* of the *Sight*; for if it be greater than it ought, we can ſee nothing, becauſe that the *Sight* is not Infinite; therefore of neceſſity we muſt have a temperate and finite *Clearneſs* to ſee well; for that a two large *Clearneſs*, or diſſipated *Light* dazles and dims the *Rays* of the *Sight*: It muſt be alſo tranſparent, becauſe the *Sight* is made by Viſual *Rays*, which are certain ſtrait and great *Lines* from the *Eye* to the *Object*, by the vertue and efficacy of which we may ſee there are Twelve *Axioms* of the *Opticks* in *Euclid*, from whence may be collected, That the *Sight* is made by ſtrait *Lines* making an *Angle* in the which *Axioms* for Brevity ſake are here omitted.

There are three parts, or conſiderations concerning the *Sight*, *viz.* when its *Rays* are caſt directly, when they are reflected, or when they are refracted.

That which is direct, properly belongs to this firſt part of the *Opticks*; the two other reflected or leſſened to *Catopricks*, or Speculars, which is the ſecond part, and contains the reaſons of greatneſſes, Fallacies or falſe Appearances which are preſented to the *Eye*, becauſe of diſtances. It alſo doth demonſtrate and diſcover all the *Impoſtures*, *Cheats*, *Effects* and *Accidents* that happen by this reaſon to the *Body*, to the *Sight*, or to the *Medium* or *Air*, which is between both, and what changes may appear in the thing, and in the *Sight* by the various quality of this *Air*, or *Medium*, and by the *Artifice* of *Glaſſes*; the experiences of which are beſt diſcovered according to the diverſity of their *Forms* and *Faſhions*; for

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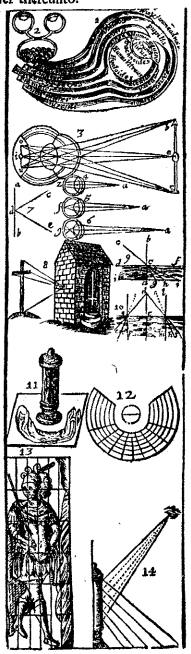
there are some that are *Concave*, some *Convexed*, some *Plain*, made in the fashion of a *Pillar*, or a *Pyramid*, viz. sharp at the Bottom, sewlling out with *Angles* reversed, regular, irregular, massive or sloping; the *Sight* transparent in the *Travers* where the *Sight* passeth.

But to avoid Prolixity, here is enough already said of this; the *Reasons* and *Probations* of things that concern the *Sight*, and of all that which depend on it are more amply demonstrated by certain *Axioms*, and taught by the learned *Mathematicians*, as *Euclid*, *Vittellio*, *Aguilonius*, *Mersennus*, *Niceron*, and many others. By which *Axioms* may be learned by what manner the *Sight* is made, and how we ought to Judge.

Axioms are grave Sentences, which are not to be contradicted, unless we will dispute against the Truth: For the *Mathematicians* seek the things that are true, and apply themselves upon those things that are Invented, seeking and enquiring from true, certain and indubitable *Sentences*, by which all the Dispute of this Art of the *Opticks* tends to demonstrate, That such *Sentences* are not doubtful, to which (after having diligently learned, and truly understood this little *Aggression*) we ought to have recourse, and recommend the Reader thereunto.



The Organ of the Sight.

THE first thing that comes to be handled in this Part of *Opticks*, is the knowledge of those parts which constitute the *Eye*, *viz.* six *Tunicles*, three *Humors*, two *Nerves*, called the *Optick*, or *Visorian Nerves*, and seven *Muscles*; the description whereof appears by the first *Figure*; not to speak of the *Fat*, or *Glandule*, of which the *Ball* of the *Eye* seems compacted; but because the *Nerves* are the principal part from which the *Eyes* seem to proceed, we will begin with them.

I. The *Optick Nerves* are produc'd from the foremost part of the *Brain*, whence after they have proceeded a little way, they all joyn together, but soon depart again asunder, so as that they form a *Figure*, resembling in some measure the *Letter* X, as is shewed in the second *Figure*. It is a thing worth the observing, that both these *Optick Nerves* are, as it were, cloathed with a double *Tunicle*, whereof one is a *Particle* of the *Membrane* of the *Brain*, which is called the *Pia-Mater*; the other, of that which is named the *Dura-Mater*; from the *Tunicles*, and from the *Optick Nerves* themselves, proceed those various *Tunicles* of which the *Eye* it self consists.

II. From the very substance of this *Nerve* dilated, and (as it were) interwoven with several *Filaments* in form of a *Net*, ariseth the *Tunicle*, which thereupon is called the *Reticular*, or *Retine Tunicle*, as from the *Pia-Mater*; that which from the heat of the Husk of a *Black-Grape* is called the *Uveal Tunicle*. This *Tunicle* involves the *Eye*, but in such a manner, that in the fore-part it hath a Hole directly answering to the *Crystalline Humor*, through which (as through a *Window*) are taken the *Species* transmitted by the *Objects*; and this is called the *Pupilla*, or *Apple* of the *Eye*; though *Aristotle*, and some others, makes the *Pupil* and the *Crystalline Humor* all one. From the *Dura-Mater* springs that, which from its hardness and transparency together is called the *Corneous*, and overspreads all the *Eye*; but as it is continued farther, and closeth the latter part of the *Eye*, it is called the *Sclerotick*, and *Consolidative Tunicle*: But over this there also runs another, which likewise overspreads almost the whole *Eye*; this is called the *Adnata*. It ariseth from the *Pericranium*, and joyns the whole Body of the *Eye* with the *Cranium* it self, within its proper Cavity; wherefore it is also named *Conjunction*: But where it extends it self almost over all the foremost part of the *Eye*, as far as the *Iris*, it is called the *Album Oculi*, or *White* of the *Eye*, and contains several small *Veins* and *Arteries*, as the *Uvea* doth, by which it receives the *Alimentitious Blood*.

Note, That in this *Tunicle* there is a *Hole*, through which the *Pupil*, and the *Uvea* is discovered in manner of a *Circle*, which by reason of its divers Colours is called *Iris*; and persons are said to have *Eyes*, *Black*, *Gray*, &c. according to the Colour which predominates in this *Iris*.

III. In

III. In the *Eye* there are three sorts of *Humors*, the first and principal is the *Glacial*, or *Crystalline*; this is encompassed by a *Tunicle*, which being as thin as a *Spiders-Web*, is therefore called *Arachnoides*; the second, from the similitude of beaten *Glass*, is called *Hyaloides*; the third, is that which is called the *Aqueous*, or *Albugineous Humor*, from the likeness of *Water*, or the *White* of an *Egg*.

IV. Each *Eye* hath seven *Muscles*, whereof two move the *Eye* upwards and downwards; two Right, and Left; two in circumference; and one by which it is sustained, and the *Sight* fix'd.

How, and in what part of the Eye the Vision is made.

I. THE Opinion of *Plato*, or *Galen*, is denyed, who hold, That *Vision* is made by the extramission of *Light*, or *Visual Spirits*, from the *Eye* to the *Object*; since when we look upon *Heaven*, how can it be imagined that so great a plenty of *Light*, or *Animal Spirit*, should be poured out to so great a distance, and such vast Spaces.

II. *Aristotles* Opinion is much more to be received, which is, That *Vision* is made by the reception of the *Species*, transmitted from the *Object* into the *Eye*, as appears by the Emanation of intentional *Colours*, which are seen continually made from *Objects*; nor could otherwise any Reason be given of *reflected*, or *refracted Vision*.

III. The Seat of the *Visual Faculty* is not the concourse of the *Optick Nerves*, since the *Species* could not be carried thither from the *Object*; neither is it in *Crystalline Humor*, for it must be in a part which is capable of receiving orderly *Species*, and terminating them; which can't be in the *Crystalline Humor*, as being altogether *Diaphanous*.

IV. This *Visual Faculty* is rather to be placed in the *Retine Tunicle*, both because it receives more commodiously, and in greater plenty, the *Animal Spirit*, necessary for *Vision*, as proceeding immediately from the *Optick Nerve*; and especially, because therein the *Species* of *Objects* keep exactly their distinction and order among themselves, as will appear in that noted Experiment described in the 8*th Figure*.

These *Species*, though as flowing every way from all parts of the *Objects*, they naturally Embody into a *Sphære*, yet can they not be received by the *Eye*, but in a certain *Conical Figure*, which they vulgarly call the *Optick Cone*, whose *Basis* is in the *Eye*, but the *Point* of it in the *Object*; nor can any thing be seen but under this sort of *Optick Cone*, whose *Axis* is a *Line* perpendicularly from the *Vertex*, or Point to the *Base*.

Note, That the *Parts*, or to speak more vulgarly, the *Points* of the *Object* do each of them (as it were) radiate in direct *Lines*, and are terminated in the *Eye* at the opposite parts of the *Retine Tunicle*; wherefore when all those *Rays* flow on every side from the *Object* to the *Pupil*, of the *Eye*, there they are said to cross and interfere, and so to digress to the proper and directly opposite Points of the *Retine Tunicle*, so as that those which are uppermost in the *Object*, are terminated in the lowermost parts of the *Retine*, and in like manner contrarily, as is to be seen in the Third *Figure*.

That Point which is vulgarly called the *Punctum Opticum*, or *Optick Point*, although it naturally act in a *Sphære*, whereby it may be seen every way, enters not the *Eye*, but under a *Conick Radiation*, whose *Apex* is in that Point, but the *Superficies* of the *Eye*, as is to be seen in the Fifth *Figure*.

Note further, That the *Rays* flowing from that *Prime* into the *Eye*, arrive not at the *Retine Tunicle* but with Refraction, and as they meet with the *Axis* of their *Cone* in one Point thereof: There are two *Cones* thence formed, of which the one is External and direct, that is, whose *Apex* is in the *Optick Point*, and its *Basis* in the *Eye*; the other Interval and Refracted, having indeed its *Basis* common with the External or direct, but carrying out its *Vertex* towards the *Retine Tunicle*: and these two *Cones*, as well the direct as refracted, constitute the Irradiation, or that total *Figure*, which from the *Visible*, or *Optick* Point is extended to the Point of the *Retine Tunicle*; and this Figure they call the *Optick Pencil*, in *Analogy* to the *Painters Pencil*; because by the benefit of that Irradiation (as it were) by a certain *Pencil*, the object *Points* it self in the *Eye*.

This happens in the *Retine Tunicle* by the Picture of the *Object*, according as is shewed in the third *Figure*; and thus it must needs be depainted altogether in such a proportion, as the external *Objects* are depainted in a *Chart*, according to Experience now approved, and represented in the 8*th Figure*. Hence also it is to be observed, That the *Animal Spirits* flow chiefly through the *Optick Nerve*, from which the *Retine Tunicle* is derived, and that the *Orifice* of the *Optick Nerve* is placed only on one side, and not in the middle of the *Retine Tunicle*, as appears in the last *Figure*; lest that part of the *Image*, which is projected from the *Object* perpendicularly opposite, should fall upon that *Orifice*, and by this means the *Picture* of the said *Image* would be disturbed.

Lastly, Take notice, that this *Vision* is either *Perfect* or *Imperfect*; the *Perfect* is said to be that which is clear and distinct; that is, whereby a thing is so represented, that it may easily be discerned by any other thing whatsoever. The *Imperfect* is confused and altogether undistinct.

It hath been already said, That *Vision* cannot be distinctly made, but by the *Axis* of a *Visual Cone* perpendicular to the *Eye*; whereas the other parts of the seen *Object* are discerned so much the more confusedly, by how much the farther they receed from the Point of the *Visual*, or *Optick Axis*; and the *Vision* is but confused, when the *Species* in the *Organ* are received without any distinct Picture of the *Object*, or when the *Object* is depainted in divers parts of the *Retine Tunicle*.

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Conditions required to Vision from the part of the Organ.

TO compleat *Vision*, Sanity of the *Eye* is in the first place required, as on the contrary any depraved Affection thereof, such as *Glaucoma*, *Gutta*, *Serena*, *Suffusion*, *Hardness* and *Thickness* of the *Corneous Tunicle*, or the like, hurts this Noble Operation of the *Sensitive Soul*.

Now supposing, as aforesaid, that *Vision* is made by a *Picture* of the *Object* in the *Retine Tunicle*, to which the *Uveal* and the *Choroides* are subtended both for the strengthning the *Retine*, and for the stopping the *Species*, and hindring too much Ingress of Light by the means of its replanted *Blackness*. It is consequently to be allowed, that the Office of the *Pupil* is so to admit within the *Eye* the *Species*, and as it were *Rays* of the *Object*, that by their decussation they may be disposed into the several parts of the *Retine*, and consequently frame a *Legitimate Picture* of the *Object*; whence the *Pupil*, which is already taken notice of to be the whole of the *Uveal*, is called the *Window* of the *Eye*; and in *Men*, and some *Creatures* besides, of a Round, but in other *Animals*, of an Oblong Form.

This *Pupil* hath the force of a *Sphincter*, by which it is capable of dilatation or contraction, not according to the pleasure, but as necessity urgeth; for when the *Light* is weak and thin, it dilates to take it in the more; but if it be over-powerful and offend the *Eyes*, it contracts to keep it out as much as may be.

This Faculty of dilating and contracting is not from an *Annular Muscle*, as that of the *Sphincter*; but from a vertue inherent in the *Membranous Circle*, which *Riolanus* places about this *Foramen*, or *Hole* of the *Pupil*, much after the manner of *Diastole* and *Systole*. Of all these *Humors* which are about the *Pupil*, that which obtains the principal place, is the *Crystalline*; the use whereof is sometimes to draw in, something to produce farther out the *Apex* of the refracted *Cone*, whence the distinct *Vision* is formed. Where note, that a distinct *Vision* is then only made, when the *Apex* of the refracted *Cone* falls upon the *Retina*, as in the 5*th Figure*. For if the said *Apex* of the retracted *Cone* should tend beyond the *Retina*, as in the 4*th Figure*, the *Vision* would be then only confused; for so the same Point of the *Visible Object* in divers parts of the *Retine*, is depainted by divers *Rays*. There is likewise a confused *Vision*, only when the *Apex* of the refracted *Cone* is on this side the *Retina*, and comes nearer to the *Crystalline*, as in the 6*th Figure*; for then from that *Apex*, or *Point* of concourse, the *Rays* of the said visible *Point* divert into divers parts of the *Retine*, and so that *Picture* becomes broader, and consequently fainter.

Thus 'tis seen how the *Eye* disposes it self to perfect *Vision*, as well by the motion of the *Pupil* either contracting or dilating it, as also by the *Crystalline*, which is either dilated, or spread abroad, or conglob'd together to give a just distance to the *Vertex* of the *Refracted Cone*; for this is the effect of the *Crystalline*; in like manner as of the *Vitreal Mote*, according as it receives different Forms thereof; wherefore Nature hath bound the *Crystalline* with certain *Filaments*, which they call *Celiar Processes*, as it were with Bonds, that by the benefit of them, there might be a *Contraction* and *Dilatation* according as need requires; therefore as the *Vitreal Mote*, by how much the more *Globous* it is, by so much the more it contracts to it self the *Apex* of the *Refracted Cone*: So the *Crystalline* the more *Globous* it is, so much the more it draws it back on this side the *Retine*, and makes the *Pencil* the shorter; which very thing happens also if the *Albugineous* humour abound; so that it obtains the *Figure* as it were of an *Omphaloptra*. Wherefore that this fault may be cured, and things recalled to their natural Aspect, there is need of the *Myoptra*, which is a sort of *Optick Glass*, hollow in the midst, and representing things less than the free *Eye* shews them; when as on the contrary the *Omphaloptra* being thicker in the middle than elsewhere, shews things bigger than the free *Eye* represents them.

Thus it being evident, That Contraries are distinguish't from each other, by a contrary reason and Method, it follows, that those who have a plainer *Crystalline*, or in whom the *Albugineous Humour* is thinner in the middle than any where else about, have the *Apex* of their Refracted *Cone* extended beyond the *Retina*, and see things less to the Life, and not so clearly and plainly if placed near, as at a distance, and therefore have most need of the *Myoptra*; whereas on the contrary those that are Purblind, and see things best nearest hand, have most need of the *Myoptra*, or *Optick Glass* hollow in the midst.

Note, That the *Crystalline* is a kind of Natural *Optick Glass* in the *Eye*, whose defects are chiefly to be mended, by the use of an Artificial *Optick Glass*, of a contrary Frame.

The *Eye*, which is the *Organ* of *Vision*, could not have been conveniently of any other *Figure* than *Spherical*, since thereby in regard of its *Convex Superficies* it receives more commodiously the *Species* from all parts. In the next place, it is of all other *Figures* the most Capacious, and therefore most capable of containing the Humours. Lastly, it is most apt for motion, and least obnoxious to harm, as having no prominent *Angle*.

It is generally held, and doubtless not without reason, that *Vision* from both *Eyes* is more clear distinct and perfect than from one; and herein we are more to rely on Experience, than on the Opinions of *Aristotle*, and *Galen*, objecting that by the shutting, or taking away of one *Eye*, all the Animal *Spirits* retire into the other; nor is it more available to urge, that those who Aim at any Mark always shut one *Eye*, it is not because the *Vision* is thereby any whit the better, but from the more sure taking Aim without interfering, or Confusion of *Images*; so that *Agnilonius* observes very well, and proves it by the way of taking Distances, That the two *Eyes* are given, not only for Ornaments sake, but as well for Use and Advantage.

This also is very observable, That where there is such a consent of both the *Eyes*, that according as one moves, the other must also of necessity be moved the same way, and this consent more probably ariseth from the consent, and in like manner of affection of the *Optick Nerves*, than from the consent of the *Muscles* of Motion, as some will have it. But that which might seem stranger, is, that every single Object, though appearing at once to two *Eyes*, is yet represented single as it is, and not double, as one single *Sound* is heard also single, though by two *Ears*; the reason is, because the Object is pointed in the same manner, and in the same kind of part and Situation in both the *Retina's*; whereas the manifold appearance of Objects Artificially represented, arises from the many *Angles* in these *Glasses*, and other Artificial Representations.

The Act of *Vision*, as well as of *Hearing*, or any Kind of *Sensation*, is made out by *Aristotle*, to be perfected in the *Brain*; and that by the Internal Concourse of that Sense, which is generally called *Sensus Communis*, or common Sense; and this may serve for another reason of the *Unity* of the Object, *Seen* or *Heard*, though the *Sensation* be External in a double *Organ*.

Conditions required to Vision from the part of the Object.

I. THat nothing is visible, but by the Illustration of Light, appears sufficiently by Experience, and it is a Tenent maintained in *Philicks*, that *Colour* is not the most proper, but Secundary Object of *Vision*; nor is actually capable of being seen, but as it is over-spread with Light.

II. The Visible *Object* ought to be *Opaque*, because as Experience teaches, the Sight ought to be terminated in that which is seen; for a Body purely *Diaphanous*, and having nothing of *Opacity* in it, cannot terminate Sight, being altogether previous to it.

III. Every Visible *Object* ought to have some sensible magnitude; and this also Experience shews, because in *Material Causes* there is no other force implanted, than that they act in a *Corporeal* Manner, and according to a certain extension of matter or Subject; nor can the *Eye* receive any kind of *Species*, unless some way or other extended. It is commonly affirmed, that no *Vision* is made but by a *Pyramid*, whose *Basis* is constituted in the Object, and its *Vertex* in the *Eye*; whereupon those things appear greatest, whose *Optick Pyramids* have the greatest *Angles* in their *Vertex*; and so on the contrary; for as the lateral Rays of those *Angles* are widened, so the *Basis* obtended against the greater *Angle* appears greatest; and as those *Angles* decrease, so the lateral Lines constituting the *Optick Pyramid*, seem to meet nearer and nearer, till by degrees the *Visible Base* more and more disappears.

IV. The *Sense* of *Sight* as to it self, extends virtually *ad infinitum*, for as much as *Vision* is not made by Emission, but by reception of the *Species*, which the *Eye* can as well receive from a remote, as from a near *Space*.

V. Nothing can be seen but by the mediation of some Distance, since every *Object* must needs have some space to send forth its *Species*; and there is required a convenient *Medium* between the Sight, and the thing seen: So *Aristotle* observes, that every Sensible placed upon the *Sense* it self, makes no Sensation; therefore things which are in the *Eye*, cannot be seen by the *Eye*; nor can any thing held too near be perfectly discerned. But on the contrary, if the Distance be considerable between the Sight, and the thing seen, the farther the thing is from the Sight, the less it appears.

The Manifold kind of Vision.

ALl *Vision* is either a *Simple Aspect*, or a more close *Inspection*. A *Simple Aspect* is that Act by which a thing is perceived, so as it first falls upon the *Eye*, and this is called *Vision* primarily first, and is made in an instant; and it may happen in this Case, that what we see, may not be perceived by us; but by *Inspection* the several parts of the Object are Distinctly known; for there cannot be a Distinct *Vision*, but according to the *Optick Axis*, by which every part is successively viewed.

Inspection is either *Simple*, or from *Præmotion*, or anticipated Knowledge. *Simple Inspection* is either made by *Vision* alone, as when it is only conversant about its proper Object, that is, *Light* and *Colour*; or when there is a comparing of one thing with another, which is an Operation of Mind, and as it were an *Induction* by way of *Syllogism*. But to come more close to our former Proposition; *Vision* is either direct, that is, which tends in right Lines to the Object, by a *Medium* of *Density*, or Rarity every way equal (and this is the most Natural) or else refract, or lastly reflexed.

Vision Refract, is that which consists of *Rays*, refracted by the meeting of a *Diaphanum* of a different, either Rarity or Density; which the better to understand, Observe that no Refraction is made, but when the Ray is croft by *Diaphanous* or Transparent *Mediums* of a different, either Rarity or Density. As *Air*, *Water*, *Glass*, &c. And that by which the *Ray* is directly carried, is called the first *Diaphanum*; that by which it is broke, is called the second *Diaphanum*.

Secondly, Note that those *Rays* only are refracted which are carried Obliquely, for *Perpendicular Rays* pass directly through both *Diaphanums*; so that to Refraction these two things are required, First a diversity of *Diaphanums* in Density; Secondly, an Obliquity of *Rays*. For the better demonstrating whereof two things are chiefly to be taken notice of, *viz.* the *Line*, or *Ray* of *Incidence*, and the *Line-Point*, or *Angle* of Refraction.

The *Line* of *Incidence* is that which flows from the Object, through the first *Medium*, in which the Object it self is, and falls upon the *Superficies* of the second *Diaphanum* occurring, as in the 9*th Figure*, *viz.* The *Radius* is *E*, *c*, if the Object is supposed to be in *E*, but *c* is the *Point* of *Incidence*, *d*, *f*, is *Superficies* of the second *Diaphanum*, which is called *Refringent*, and in which is the *Point* of Refraction to *c*; the right *Line b*, *a*, drawn through *c*, the *Point* of *Incidence* is simply called *Perpendicular*; if it fall obliquely upon

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upon the *Superficies* of the second *Diaphanum*, and inclines to the *Perpendicular Line b, a*, the *Refracted Line* will be *c, g*, and the *Angle* of *Refraction b, c, g*. But if it break, and recede from it, the *Refracted Line* will be *c, f*, and the *Angle* of *Refraction b, c, f*. The same Proportionally may be seen in the *10th Figure*.

Note, That this is ever observed in *Refractions*, that when the *Ray* is struck through by the first *Medium*, or inclines from the thinner *Diaphanum* through the thicker *Medium*, the *Refraction* is made to the *Perpendicular*. But on the contrary, if it be produc't from a thicker *Diaphanum* through a thinner *Medium*, the *Refraction* is made from the *Perpendicular*, and this is certain, That the *Rays* propagated through a thicker *Medium* are thereby rendred the more strong and active, it being common to all natural Agents to act the more vehemently in a thicker Subject; so Combustion is made in *Burning-glasses* by the help of this sort of *Refraction*.

The sight is very much help't by *Tubes*, *Prospectives* and other sorts of *Optick Glasses*, because by the means thereof the visual Species pass more strongly and directly to the *Eye*, by reason of the long passage, and have all their virtue, the better rallied, and united together.

Amongst the *Effects* of *Refraction*, these are principally taken notice of, First, that by this means Things appear greater, or lesser, according as the *Refraction* is made from the *Perpendicular*, or to the *Perpendicular*. Thus to us who are in the *Air*, *Fish* appear in clear Water bigger and nearer, because in that case the *Refraction* is made from the *Perpendicular*, so that the *Rays* the more they decline from it, the greater *Picture* they make in the *Eye*; whereas we appear less and more remote to the *Fish*, by Reason of the contrary *Picture* in the *Eye*. Thus by *Refraction* the place is apparently changed; in the same manner as the *Stars* appear to us as risen, when indeed they are beneath the *Horizon*. Thus *Refraction* changes the *Figure*, as when by reason of the Interjected *Clouds*, the Morning, or Evening *Sun* seems under an *Ellipse*.

The second thing taken notice of amongst the Effects of *Refraction* is, that to any one looking through a *Triangular Prisme*, there will appear Objects tinged with strange *Colours* like a Multiplied *Rain-bow*; and those things which are in *Plano*, seem raised upwards in a strange manner. The *Trigon* being in a particular manner disposed to the *Eyes*. *Vision Reflect* is that which is made by the *Species*, not streight impresst from the *Object*, but rather directed from the *Object* to the *Speculum*, and Reflect from the *Speculum* to the *Eye*. Thus in the *7th Figure*, we may observe the *Speculum a, b*, receiving the *Species* from the *Object c*, the *Line c, d*, is called the direct *Radius*; in *d*, is the *Point* of *Incidence*, the *Line d, e*, is the *Line* of *Reflection*, making a like *Angle* of Reflection *e, d, b*, with the *Angle c, d, a*, which is called the *Angle* of *Incidence*.

The *Speculum* is either perfect, and properly so called, or imperfect, or improperly so called; the perfect is that which should remit the *Species*, wherefore it is to be *Terse*, *Polite*, *Equal*, and *Opaque*, otherwise it will not remit the *Species* and *Image*. The Imperfect is that from which the *Species* are not Reflected to the *Eye*, but rather are as it were terminated in the Reflecting Body it self.

Of the perfect *Specula* some are plain, some *Spherical*, either *Convex*, or *Concave*, some *Conical* either *Convex*, or *concave*, and some *Cylindrical*, *Eliptical*, *Perabolical*, &c.

Note, that in a perfect *Speculum*, that is not the *Species* which seems to be, but rather the *Object* reflext by the *Species* from the *Speculum*, because otherwise, the same must needs happen as in imperfect *Speculums*; for Eample, in *Paper* wherein through the Hole of a Chamber, shut close from Light, the *Species* are received, and that apparent *Image* would be seen in the *Speculum*, every way in like manner as the *Species* received, whereas it is not seen but in the *Line* of the Reflexion.

But then some will say every *Speculum* ought to represent the *Object* under the same Form, and Magnitude, whereas Experience shews that a smaller *Speculum* shews it in a smaller Form and Magnitude. To which may be answered, That a plain *Speculum*, whether little or great, attributes the same Magnitude to the *Object*, only with this difference, that a small *Object* may be seen whole in a plain *Speculum*, when a great one cannot. Moreover it may be said, that the *Speculum* being divided into parts, the *Object* would not be manifoldly represented, for as much as not the *Image* in the *Speculum*, but only the thing objected by the *Speculum*, is seen. To which it may be answered, That the breaking of the *Speculum*, if it change the Representation of the *Object*; for when it doth change it, it happens by reason of the changed Situation of its Parts.

It is lastly *Objected*, that the *Speculum* being moved, and the *Object* unmoved, the *Object* could not appear during the Motion; for as the *Object* only, not the *Species* is seen in the *Speculum*, We answer that the *Object* unmoved seems then to be moved, when in this or that part of the *Eye*, it is successively Painted; but that the Motion of the *Speculum* doth, whence it Represents the *Object* as it were in Motion.

Concave Speculums render the *Images* greater, the *Convex* shew them lesser, whereas the Plain ones Represent them as they are.

The 11, 12, 13, and 14, *Figures* make appear according to *Rules* of *Reflection* already delivered, how an *Image* perfectly deformed, is represented in its true shape in the *Cylindricum Speculum*, that is, a Division being made by divers *Quadrangles* at pleasure, these parts which are designed in each of these sort of *Quadrangles* inscribed in the hidden *Circles* about the *Cylindricum Speculum*.

The Vision of common Objects.

THose thing are called common *Objects*, which are perceptible, not only by one of the common *Senses*, but by other also, with the accession of the internal *Sense*, which they call *Sensus Communis*, with the help also of our reason. Thus *Magnitude*, *Distance*, *Place*, *Figure*, *Motion*, *&c.* fall not only under the Sense of *Seeing*, but are likewise judg'd by the Sense of *Feeling*. As for *Beauty*, *Deformity*, *Shade*, *Darkness*, &c. though they are Objects of the *Sight* only; yet they are not the proper Objects of the *Sight*, as *Light* and *Colour*, but hold as it were a middle place between common and proper.

The *Quantity* of any *Object* seems bigger or lesser, according to the respect of the *Angles* which are made, as the *Vertex* of the *Optick Pyramid*; so that through a small Hole of a *Board* any thing appears so much the bigger, by how much the nearer it is brought to the *Eye*; because the *Angle* of the *Vertex* of the *Optick Pyramid* is so much the more widened.

It can't well be judged what is *great* or *small*, *thick* or *thin*, *long* or *bread*, but by the accession of the internal *Sense* to the external.

Distance is perceived by comparing together the Extreams, and the Body interposed; and for this Reason the *Heaven* appears at the *Horizon* joyn'd with the *Earth*, because we can discern nothing interposed.

Motion may be perceived when we distinguish between the Thing moveable, and the Space to whose parts it is successively applyed. Whence it follows, That a very swift Motion snatches from our *Eyes* the thing moved, as a *Bullet* from the Mouth of a *Musquet*; because by this means there is made an insensible application of the Thing placed to the Place.

In like manner it is worth observation, that a very slow *Motion* is not perceived when it is in Action, but only when it is compleated; as the Motion of a *Shadow* on a *Dyal*, because a slowness of that Nature renders the change both of the Place and Thing insensible.

The Fallacies of Sight.

THe *Fallacy* of the *Sight* is, when an *Object* is sometimes represented otherwise than really it is in it self; this ariseth sometimes from the vitiated *Organ*, as in those that are troubled with the *Jaundice*, or from that defect of the *Medium*; as if *Snow* be seen through a *Red Glass*, it appears otherwise than what it is in it self.

There is also a *Fallacy* of *Sight* arising from Distance, when by reason of overmuch Distance those Things which are really bigger, appear less; and long *Walks* appear narrower and narrower from the beginning towards the end. Moreover, *Sight* fails as to the *Figure*, as when a *Circle* plac'd obliquely appears like an *Ellipsis*; because the *Species* proceeding from thence by reason of the obliquity of the Situation is more contracted on one side, and so represents the *Image* of the *Circle* as it is.

Lastly, There is a *Fallacy* as to *Motion*; as when to those that *Sail*, the *Shoars* seem to move, and *Cities* seem to go back, when indeed 'tis the *Ship* that moves.

All *Fallacies* in the Act of *Beholding*, arise from the short-sightedness of the Beholder; as when there appears but a *Foot* in *Diameter*, when as it is of a Magnitude infinitely bigger. Or from a false Estimation; as when any one beholding a *Fire* afar off, thinks it to be a *Star*: Or from a *Paralogism*, as when that Motion is imputed to the *Moon*, which is really in the *Clouds*.

Sometimes the Error is only in the *Mind*, either wavering in doubtful things, or moved by a contrary *Affection*; or by *Phrensie* justled from its proper Seat, or for want of serious Attention.

These Errors may be corrected as well by the *Mind*, as by other inward and outward *Senses*; as when the *Touch* finds that to be plain in *Picture*, which to the *Eye* seems prominent, or jutting out; and the *Understanding* corrects the erring Faculty, and it self, when the cause of the Error is taken away, and so as well the internal, as the external *Senses*, have such a connexion with the *Intellect*, as to contribute mutual assistance to each other. Who desires to see these things more fully discust, let him consult *Vitelle*, and *Aguilonius*.

PERSPECTIVE.

Of Necessary things in Perspective, relating to Drawing *and* Painting, *which every Practitioner ought to be experienced in, for the better understanding the true Proportions and Distances of* Figures, Houses, &c. *in Landskips.*

BY *Perspective* we behold, and draw the likeness of all *Magnitudes* in the manner and Form as they shew themselves to the *Eye*. The Matter to be seen is a *Magnitude*, and the Manner of seeing is by *Radiations* of *Light*, either direct, reflected, or refracted. Likewise, a *Magnitude* is that which hath Form, and is either lineal, superficial, or solid; that is, either a Complication of *Points*, *Lines*, or *Superficies*.

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A *Line* is a complication of *Points*, being a Length only, without Breadth, or Thickneſs.

A *Superficies* is alſo a complication of *Lines*, being a Length with Breadth, but without Thickneſs.

A *Solid* is a complication of *Superficies*, that is, a Length and Breadth with Thickneſs.

To draw the Appearance in *Lines* is the chief part in this *Art*, whereby the *Idea* conceived in the Mind by *Sight*, or otherwiſe, is brought to Light.

A *Radiation* is a Beam of *Light*, conveying the likeneſs of the thing to the *Sight*, and the knowledge thereof to the *Underſtanding*. *Direct Radiations* are thoſe which conſider the direct or ſtrait *Beams*, that paſs between the *Eye* and the *Object*. *Reflected Radiations* are thoſe that conſider the reflection of *Beams*, with their ſhape upon any poliſhed Body. For Example, On a *Globe*, *Pyramid*, *Cone*, *Cylinder*, or any other regular *Solid*; and this properly belongs to *Catoptricks*. *Broken Radiations* are thoſe that conſider the breaking of *Beams*, as they are to be ſeen through a *Glaſs*, or a *Cryſtal* cut into ſeveral *Plains*, or *Superficies*: And this part properly belongs to *Dioptricks*.

The Active part of *Perſpective* is either *Ichnographical*, *Orthographical*, or *Scenographical*: *Ichnography*, is the deſcription of the plain *Baſe*, or the bottom of any *Body*, or *Building*, and is twofold, *viz. Geometrical*, or *Scenographical*; the *Geometrical* is that which gives the Sight of the Bottom, or Baſe of any *Body*, or *Building*; the *Ichnography-Scenographical* is the appearance of the ſame *Baſe* in *Section*, or through a *Mirror* erected upright on the ſame Plain on which the *Baſe* ſtands. *Orthography* is the *Viſion* of the fore-right Side of any *Plain*, *viz.* of that *Plain*, or *Superficies* which lies Equidiſtant to a right *Line* paſſing through the outward or convex *Centers* of both *Eyes* continued to a due length; ſo that *Perſpective Orthography* is the delineation of the apparent right Plain. *Scenography* is the deſcription of a *Plain*, or other *Figure*, that declines from the apparent or fore-right *Plain*, that is, of that *Plain* which makes *Angles* with the ſaid fore-right *Plain*. Between the *Orthographick* and *Scenographick Viſion* there is this difference; the *Orthographick* repreſents the Side of a *Body*, or *Building*, as it is beheld, when the *Plain* of the *Glaſs* is placed Equidiſtant to that ſide; but the *Scenographick* expreſſes the Side of a *Body*, or *Building*, as it appears through a *Glaſs* raiſed obliquely to the ſaid Side, or making an *Angle* therewith.

Of the Subject to be ſeen.

THE *Baſe* of any thing is the *Plain*, *Flat*, or *Floor*, upon which any ſolid Body or Object is placed, or raiſed.

The *Altitude* is the Perpendicular ſpace of place, betwixt the *Baſe* and the *Eye*, or height of the *Viſual Point* above the *Baſe*. The *Viſual Point* is a *Point* in the *Horizontal Line*, wherein all the Beams of the *Eyes* Unite. The *Horizontal Line* is a *Line* that proceeds from the *Center* of the *Eye*, to the *Viſual Point*, parallel to the *Horizon* of the *Earth*.

The *Diſtance* is the ſpace on the *Baſe*, between the *Glaſs* and *Point* in the *Baſe*, that lies directly under the *Eyes*.

The *Section* is a *Plain* of Tranſparent matter (as of *Glaſs*) raiſed upright upon the *Plain* of the *Baſe* ſtanding before you, parallel to a ſtrait *Line*, paſſing through the *Convex Centers* of both *Eyes*. Now without the underſtanding of this *Section* or *Glaſs*, tis impoſſible to attain to the Knowledge of *Perſpective*, and by Conſequence will not be able to give a reaſon for the difference betwixt the *Orthographick*, and *Scenographick Figures*.

If the *Glaſs* is placed near the *Viſual Point*, and remote from the *Object*, the *Figure* which is ſeen will be very ſmall; becauſe all *Rays* comprehending the *Orthographical*, and *Scenographical*, *Figures* fall into the *Viſual Point*, as their Common *Center*. If the *Viſual Point* be more raiſed (though at the ſame Diſtance) the *Scenographick Figure* or Form will appear much larger. And by reaſon the *Viſual Radiations* are higher, the various *Perpendiculars* raiſed on the *Section*, or *Glaſs*, cut them in wider diſtances, as being more remote from the *Glaſs*. If the *Glaſs* incline to the *Viſual Point*, the *Scenographick Viſion* will be longwiſe between the *Viſual Point* and the *Object*; But if the *Glaſs* recline from the *Viſual Point*, the *Scenographick Figure* will appear rounder, and begin to reſemble the *Orthographick*. But if the *Glaſs* is fixed *Equidiſtant* to the *Baſe*, or *Plain* the *Object* ſtands upon, the *Scenographick* and *Orthographick* reſemblance will be one and the ſame.

Diagonals, or *Lines* of *Diſtance*, are ſuch as are drawn from the *Point* of *Diſtance*, to any other *Point* higher, or lower than the *Horizon*.

The *Object* is that *Form*, *Body*, *Figure*, or *Building* intended to be expreſſed in *Perſpective Proportions*.

The General Practice of Perſpective.

LEt the *Object* you are to draw, ſtanding on your right Hand, be alſo placed on the ſame Hand of the *Viſual Point*; and that on the left on the ſame ſide of the ſaid *Point*, and that which is oppoſite before in the middle of it.

Let every *Line* which in the *Object* is *Strait*, *Parallel*, or *Perpendicular* to its *Baſe*, be alſo ſo in its *Scenographical Delineation*.

Let thoſe *Lines* that are in the *Object Equidiſtant* to the returning *Line*, be drawn in the *Scenographical Figure*, from that *Point* found in the *Horizon*.

Let the *Lines* which in the *Object* return at right *Angles* from the fore-right ſide, be drawn *Scenographically* from the *Viſual Point*.

The *Center* in any *Scenographical Regular Figure*, is found by drawing croſs *Lines* from oppoſite *Angles*, for the *Point* where the *Diagonals* croſs in the *Center*.

In Drawing a *Perſpective Figure*, where many *Lines* come together, for the directing your *Eye*, you may draw the *Diagonals* in *Red*; the *Viſual Lines* in *Black*, and the *Perpendiculars* in *Green*, or any other different Colour.

A Ground *Plain* of *Squares* is alike, as well above, as below the *Horizontal Line*; Nevertheleſs, the more it is diſtant above or below the *Horizon*, the *Squares* will be ſo much the wider and larger.

Let all *Strait Lines* which in the *Object* return from the fore-right ſide, run in a *Scenographical Figure* into the *Horizontal Line*.

In Drawing *Arches*, *Circles*, *Croſſes*, *Ovals*, *Spirals*, or the like *Figures* in the *Roof* of a *Room*; firſt drawing *Ichnographically*, and ſo with *Perpendiculars* from the moſt eminent *Points*, carrying it up to the *Ceiling*; from which ſeveral *Points* carry on the *Figure*. And in ſetting off the height of *Pedeſtals*, *Columns* and the like, meaſure the Height from the *Baſe-line* upward, in the Front or fore-right ſide; and a *Viſual Ray* drawn, that *Point* in the Front ſhall limit the Altitude of the *Column* all the way, behind the fore right-ſide, even to the *Viſual Point*.

Thus having conſidered the Diſtance, Height and Poſition of the *Figure*, and drawn it accordingly, with the *Side* or *Angle* againſt the *Baſe*; raiſe *Perpendiculars* from the ſeveral *Angles*, or deſigned *Points* in the *Figure* to the *Baſe*, and tranſfer the length of each *Perpendicular* from the place where it touches the *Baſe*, on the ſide oppoſite to the *Point* of *Diſtance*; and ſo will the *Diametrals* drawn to the *Perpendiculars* in the *Baſe* by *Interſection*, with the *Diagonals* drawn to the ſeveral tranſferred *Diſtances*, give the *Angles* of the *Figure*: And ſo *Lines* drawn from *Point* to *Point*, will Circumſcribe the *Scenographical Figure*.

If in a *Landskip* there be any ſtanding *Waters* or *Rivers*, place the *Horizontal Line* level with the fartheſt ſight thereof. In Deſcribing things at a great *Diſtance*, the proportion as to *Magnitude*, and *Diſtance* muſt be obſerved, which appears from the *Object* to the *Eye*. And if there be any *Houſes*, or other *Edifices*, conſider their Poſition, to find from what *Point* in the *Horizontal Line*, to draw the *Fronts* and *Sides* thereof.

And Laſtly, in *Colouring* and *Shadowing* of every thing, obſerve the ſame in your *Picture*, which you do by your *Eye*, eſpecially in Objects that are neat; but according as the *Diſtance* grows greater and greater, ſo the *Colours* muſt be fainter and fainter, till at laſt they loſe themſelves in a Darkiſh *Skie-colour*.

Of Catoptricks, *and* Dioptricks.

THE *Catoptricks* are beſt ſeen in a common *Looking-Glaſs*, where if the *Glaſs* be exactly flat, the *Object* is in all reſpects like its Original, or Patern; but if it is not flat, the reſemblance alters from its Original, and that more or leſs, as the *Glaſs* differs from an exact Plain: In the Drawing of *Catoptrical Figures*, the Surface of the *Glaſs* is to be conſidered, upon which the *Reflection* is to be; for which you muſt make a particular *Ichnographical Draught*, which on the *Glaſs* muſt appear to be a *Plain* full of *Squares*; on which Projection tranſfer what ſhall be drawn, on a *Plain*, divided into the ſame Number of like *Squares*; where though the *Draught* may appear very confuſed, yet the Reflection thereof on the *Glaſs*, will be very proportional and reregularly compoſed.

The *Dioptrick*, or *Broken Beam* may be ſeen in a *Tube*, through a *Cryſtal*, or *Glaſs*, which hath its Surface cut into many others, whereby the *Rays* of the *Object* are broken. When theſe *Faces* on a *Cryſtal* are returned towards a *Plain*, placed directly before it, they ſeparate themſelves at a good *Diſtance* on the *Plain*; becauſe they are all directed to various places, far diſtant places of the ſame.

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DRAWING, AND PAINTING.

CHAP. I.

The Introduction.

THE Art of *DRAWING*, and *PAINTING*, not improperly called *POLTGRAPHT*, so much imitateth Nature, as that by proportional *Lines*, with suitable and apt *Colours* it represents to the Life the Forms of all Corporeal things, with their respective *Actions*, *Gestures*, and *Passions*.

It consists of three Parts, *viz. Design*, *Proportion*, and *Colour*, all which are expresst in as many sorts of *Painting*, to wit the *Life*, *History* and *Landskip*.

Drawing represents the shape and form of any Corporeal Substance in rude *Lines* only, and if to *Proportioned* quantity *Colour* is added, you have the Form and Perfection of the *Figure*. The *Proportion* gives the true breadth, length, and bigness of any part in respect of the whole, shewing how they bear one to another.

The *Passions* of the *Mind* are seriously to be considered, and well understood, whereby to represent the same in the several *Gestures*, as *Love* or *Hatred*, *Pride* or *Humility*, *Joy* or *Sorrow*, and the like.

The Original of this *Art* was taken from the *Forms* of *Things* that appear; expressing the same with apt and proper *Colours*, thereby imitating the *Life*. This imitation of things seen by the *Eye*, was very much furthered by the *Idea's* of things conceived in the *Mind*, from the continual motion of the *Imitation*. These *Forms* and *Idea's* were not singly considered, but complicately; And from this manner of *Imitation* did arise knowledge of *Designing*, and from thence came the Arts of *Painting*, *Washing*, &c.

As *Invention* gave way to the advancement of Art, so the advancement of the same made way for its Perfection. Ease of *Invention* which gave Encouragement, plenty of *Matter* which gave *Formation*, and Neatness of *Work* which gave Delight; which was the Reasons that *Art* was so advanced. Likewise the ardent desire of emulation to excel others, together with the satisfaction of doing well, gave a large progress thereunto; *Art* therefore meeting with *Success*, created a boldness in the *Spirits* of *Artificers* to attempt the greatest things. The absolute Perfection of the *Art* of *Painting*, the excellency of *Invention*, *Proportion*, *Colour*, *Life*, *Action*, *Passion*, &c. must universally concur and conspire to bring forth that gracefulness which is the very Life of the *Work*, and the sum of all Perfection.

To *Drawing* and *Painting* belongs (as Handmaids) the true knowledge of *Arithmetick*, *Geometry*, *Optickr*, and *Perspective*, without which none can be brought to Perfection; and to be *Universal Painters*, they must be grounded in *History*, *Philosophy*, &c.

CHAP. II.

Of the Precepts of Drawing in general.

BE careful to be provided with all necessary things for *Drawing*, as *Charcoals*, *Feathers* of *Ducks-Wings*, *Pens* made of *Ravens Quils*, *Pastils*, *Crions*, *Black* and *Red-Lead Pencils*, *Rulers*, and *Compasses*; but it will be convenient to practice as much as possible without the help of the *Rule* and *Compass*, for your *Eye*, and *Fancy* should judge thereof without Artificial Measurings.

Thus being prepared with the aforesaid Necessaries, together with good *Vellom*, *Parchment*, or fine thick *Paper*, begin with plain *Geometrical Figures*, as *Lines*, *Angles*, *Triangles*, *Quadrangles*, *Circles*, *Arches*, *Ovals*, *Polygons*, *Cones*, *Cylinders*, and the like, for the *Circle* helps in all round Forms; the *Oval* gives a true proportion to the *Face* and *Mouth*; the *Triangle* in the Half-Face; the *Angles* and *Arches* are in use in *Perspective*, and *Architecture*; the *Polygon* in *Ground Plats*, and

To the Right Honble Charles Bodvell,
Viscount Bodmyn Grandson and
heyre to the Right Honourable
John Earle of Radnor &c.a

OVA SUPRA

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and *Fortification*; the *Cone* in *Spires* and Tops of *Towers* and *Steeples*; and the *Cylinder* in *Pillars*, *Pilasters*, and *Columns*.

Being expert and ready in general *Proportions*, endeavour to give every *Object* its due Shade, according to its Concavity or Convexity; and to elevate or depress the same, as the *Object* appears either nearer or farther off the Light; and this is the Life of the *Work*. Next proceed to draw *Fruits* with their *Leaves*, *Flowers*, *Trees*, and the like. Next to *Beasts*, *Fowl*, *Fish* and *Insects*; And being a good proficient therein, proceed to *Naked Figures* of *Men* and *Women*: but first to the several parts of the Body; and then to *Draperies*, in all which be sure to imitate Nature as much as possible; and in drawing all the aforesaid *Forms* you must be expert in the exact Proportions, and in the general or *Out-Lines*, before you venture to *Shadowing*.

You ought to be provided with good *Patterns* or *Copies* to draw by, first using your *Coal*, and then more exactly with your *Pencil*, after you have fully examined it, found, and corrected the Faults, and this may be done by frequent Trials.

Being arrived to Perfection in these Particulars aforesaid, you may begin to Draw by the Life, which is the best and perfectest *Copy*; And in all sorts of *Drawing*, be sure to attain to Perfection before you venture on *Colours*, for that in a short time will be attained unto, after you are Master of the rest.

Be careful in observing the true distance of one *Joynt*, or *Muscle*, from another; as likewise their *Length*, *Thickness*, *Windings*, *Turnings*, *Shadows*, and the like.

In *Drawing* after *Embossed*, or *Plaister-Works* chuse a good *North-Light*, something above your *Work*: But if the *Room* has a *South-Light*, put before the *Window Oiled-Paper*; and if you Draw by *Candle-Light*, use a *Lamp* Shaded with *Oiled-Paper*, instead of a *Candle*, which is not so good, as growing lower and lower, and causeth the *Shades* to change.

In Drawing the *Muscles*, be sure to follow the *Life*, or else to have good *Copies*; and in that side where the Parts are most apparent in the performing any Action, the *Muscles* must more or less appear, according to the force of the *Action*. And observe, that the *Muscles* in Young or Fat Persons must not appear so strong and hard, as in Aged Persons; and in *Women* they are scarce to be expreſt at all.

CHAP. III.

Directions for Drawing after a Print, or Picture.

IN drawing after a *Picture*, or *Print*, chuse such a Light, that the reflection of the *Colours* doth not obstruct your Sight, that is, that the *Light* and your *Eye* may equally fall obliquely upon your *Piece*; and withal at such a distance, that you may see it all at once; so so that the greater your *Picture* is, the further distance must you place it to Draw after; and let it be always before you with a little reclining.

When you first proceed to work, Draw all your *Out-Lines* very faint with a *Charcoal*, by reason you may rub them out if amiss, with your *Feather*, or a Piece of *Bread*, and so mend the Faults more easily; these *Out-Lines* are to be drawn very true, according to your *Copies*, before you begin to *Shadow* any part thereof, and let the *Out-Lines* next the Light be drawn very soft and faint; Thus having Drawn one *Feature*, and examined it well by the *Copy*, proceed to the rest, until you have finished the whole *Draught*; and think not your time long, for according to the *Proverb*, *Haste makes Waste*, for you had better bestow three Days, and do it well, than three Hours, and spoyl it; besides, slubbering over Work spoyls your Hand, and begets an Ill habit in you.

CHAP. IV.

Rules to be observed for the Imitation of the Life.

CHuse a well-shaped *Man*, or *Woman*, which must be placed in a good and graceful Posture; the like *Rule* must be observed in all Living *Creatures*; and first make a *Schetch*.

In Drawing a *Face*, great care is to be observed as to the Imitation of the *Life*; First, making the out-Lines, or Circumference of the *Head* and *Face*, either *Round*, *Long*, or *Oval* as the *Life*; then to Draw the *Eyes*, *Nose*, *Mouth*, and all the Touches therein, both strong and faint for the giving a *Life* and *Spirit* thereunto; in all which observe in your *Draught* a kind of carelessness and loosenes; for a *Picture* that appears in any of the *Joynts Stiff*, or *Lame*, is of no Value. And in all things the Perfection of Nature must be observed.

Now for your better attaining the same, it were convenient to have the Assistance of a good *Master*; likewise to be furnished with excellent *Draughts* done by the best *Masters*, were not amiss; by which the true Shape of the *Body*, and all its *Limbs* is expreſt in all, or most *Postures*, *Gestures*, and *Actions*. But for your better directions for drawing a *Face*, having, as aforesaid, drawn the Circumference thereof, make a Stroak down from that place of the *Fore-head*, which is even with the *Chin*, coming down where you should place the Middle, or Tip of the *Nose*, and Middle of the *Mouth*, which Stroak make strait down in a full right *Face*, but *Arched*, or *Oval* in an Oblique *Face*, leaning that way towards which the *Face* doth Turn; then cross the Stroak about the Middle of the *Eyes*, either with a strait Line in a right *Face*, or with a Curved up-

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upwards or downwards, according to the *Action* or *Posture* the *Face* you draw is in; then make another answerable to that where the End of the *Nose* should come, and another for the *Mouth*, that it be not made crooked. In a true Proportioned *Face*, the distances are, 1. between the Top of the *Fore-head*, and the *Eye-brows*; 2. between the *Eye-brows*, and the bottom of the *Nose*; and 3. between the bottom of the *Nose*, and the bottom of the *Chin* are equal. The distance between the *Eyes* is the length of one *Eye*, in a full *Face*, but in a three-quarter or half *Face*, tis proportionally lessened, and place the *Nostril* exactly underneath the Corners of the *Eyes*.

Thus having finished the several parts of the *Face*, with all the graceful touches, proceed to the *Hair*, and *Beard*, in which no small care must be taken in observing the *Curles*.

For Drawing of *Hands*, and *Feet*, with other extream Parts, First draw them faint over with *Coal*, observing all the *Joynts*, *Sinues*, *Veyns*, &c. with their Bendings, Turnings and the like; And for this Particular choose excellent *Prints*, or *Paintings*, which will be very Advantageous in the perfecting your Drawing.

For Drawing the *Whole Body*, First begin with the *Head*, which must be in Proportion to the bigness you design the *Whole Body*, next proceed to the *Shoulders*, then the *Trunk* of the *Body*, from the *Armpits* down to the *Hips*, and then the *Legs*, *Arms*, and *Hands*; all which must agree together as to Symetry of Parts. Then let the Parallel *Joynts*, *Muscles*, *Sinues*, and *Veyns* be placed opposite to one another in a Strait Line, that is, *Shoulder* to *Shoulder*, *Knee* to *Knee*, and the like; and to this end draw strait Cross Lines for your better directions, observing, that which way the *Body* turns or bows, these Lines may accordingly answer. In like manner all *Perpendicular Joynts* and *Parts* are to be placed in a right Line one under another; and for your better direction therein, draw a strait Line (provided the *Body* be strait) from the *Throat* through the midst of the *Breast* or *Privities*, to the *Feet*, to which Line draw all those Particular Points *Parallels*, that the *Body* may not appear crooked, or awry.

As to *Proportion*, first draw out the *Head* in an *Oval*, allowing one *4th* part for the *Hair*, one *4th* part for the *Fore-head* and *Brows*, another *4th* part for the *Nose*, and another *4th* part for the *Mouth* and *Chin*. Having drawn the *Head*, measure out 8 times the length thereof, the *Head* making one of the eight parts, and so draw a Line from the Top of the *Head* to the *Feet*, of these 8 parts, one *Heads* length from the *Chin*, is for the *Breast*, another to the *Navel*, another to the *Privities*, then one to the middle of the *Thigh*, also another to the *Knee*, another to the small of the *Leg*, and another which is the *8th* part to the *Heel*.

The breadth of the *Shoulders* is about 2 measures of the *Head*; the breadth of the *Hips*, 2 measures of the *Face*; the *Arms* stretched out are just the length of the whole *Figure*, including the Breast; but without the *Breasts* they are but 6 *Heads*. The length of the *Hand* is exactly the length of the *Face*, and the *Arms* hanging down reaches within a Span of the *Knee*.

In *Shadowing*, let the *Shadow* always fall one way, that is on the same side of the *Body*, leaving the other side to the Light. Let the *Shadow* grow fainter and fainter according to the greatness of the distance. All Circular *Bodies* must have a Circular *Shadow*, according to their Form, or appearance, and the Orbicular *Shadow* of the *Object* which casteth it. When contrary *Shadows* concur, let the meanest and most *Solid Body* be first served; and in double and treble *Shadows*, let the first *Line* be very dry, for fear of blotting before you cross them. All perfect Lights receive no *Shadow* at all, but being manifest, are only to be made apparent by that *Body* which receives them, whose *Shadow* must be according to the Efflux of Light.

In drawing of *Muscles* the *Motion* of the whole *Body* is to be considered; In the rising and falling of the *Arms*, the *Muscles* of the *Breasts* more or less appear; the like doth the *Hips* according as they bend outwards or inwards; and the same chiefly in the *Shoulders*, *Sides*, and *Neck*, according to the several *Actions* of the *Body*, all which alterations are to be carefully observed. These ensuing *Figures* shew the same in several sorts of *Gesture*, with the *Poise* of the *Body* suitable thereunto.

CHAP. V.

Of Drapery.

First draw the greatest and Principal *Folds*, which must be continued through the whole *Garment*; the lesser you may break off, and shorten at pleasure; and let them Cross one another. Likewise all the *Folds* must consist but of two Lines, which may be turned with the *Garment* as you please, *Shawdowing* the innermost deeper, and the outermost more light.

Let your *Garments* be suitable to, and bend with the *Body* in any Posture; and the closer the *Garment* sits to the *Body*, the narrower and smaller must the *Folds* be; and that part of the *Garment* which sits close to the *Body* must not be *Folded*, but only sweetly *Shadowed*, whereby the *Body* that is under it may be represented.

The *Folds*, or *Plaits* ought to run out every way, like Branches or *Arms* from the *Body* of a *Tree*, and in such sort that there be no part of the *Garment* without some *Folds*.

The Nature and Disposition of *Light* ought to be examined, especially as it hath Relation to the *Sun*, or any bright *Body*, for that Colours cannot be seen but in the Light; for Example, Suppose *Blue* be equally dispersed through all the parts of a *Garment*, yet when it is illustrated by any Light, it causeth one kind of Brightness in that part where it strikes strongly: Another kind of Lustre where it strikes more weakly; and another in that part where it yet shines less. The *Lights* are made by mixing a greater or lesser quantity of *White* to the *Blue*; and Darker, by adding

To the Right Worshipfull S.r Henry Hobart of Blickling in Norfolk Knight and Baronet, Son and heyre to S.r John Hobart of the said Place Baronet deceased.

This Plate is humbly dedicated by Richard Blome.

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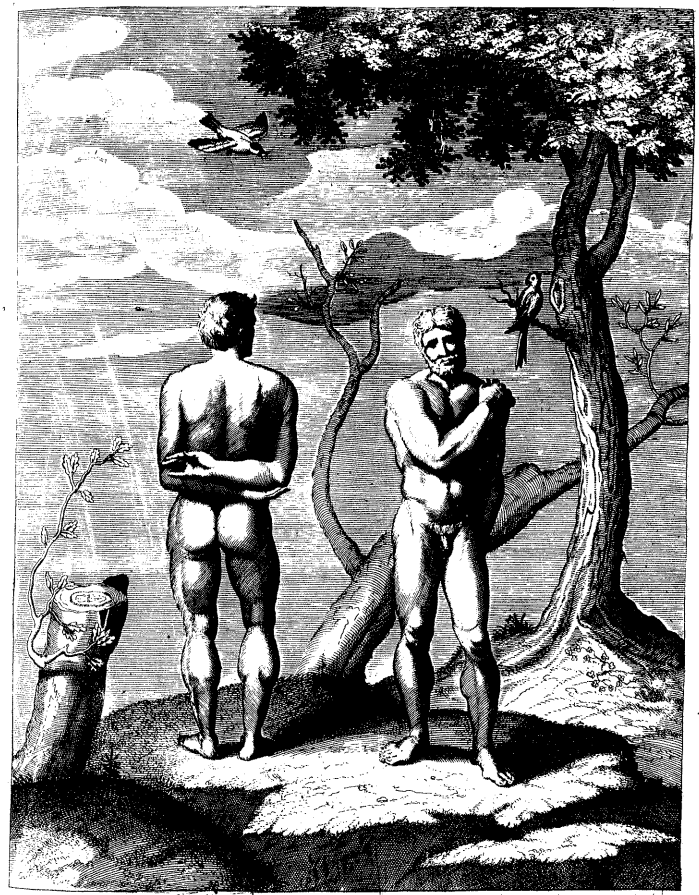

Painting

To the Right Worshipfull Sr. John Osborne of Chicksand in ye County of Bedford Baronet

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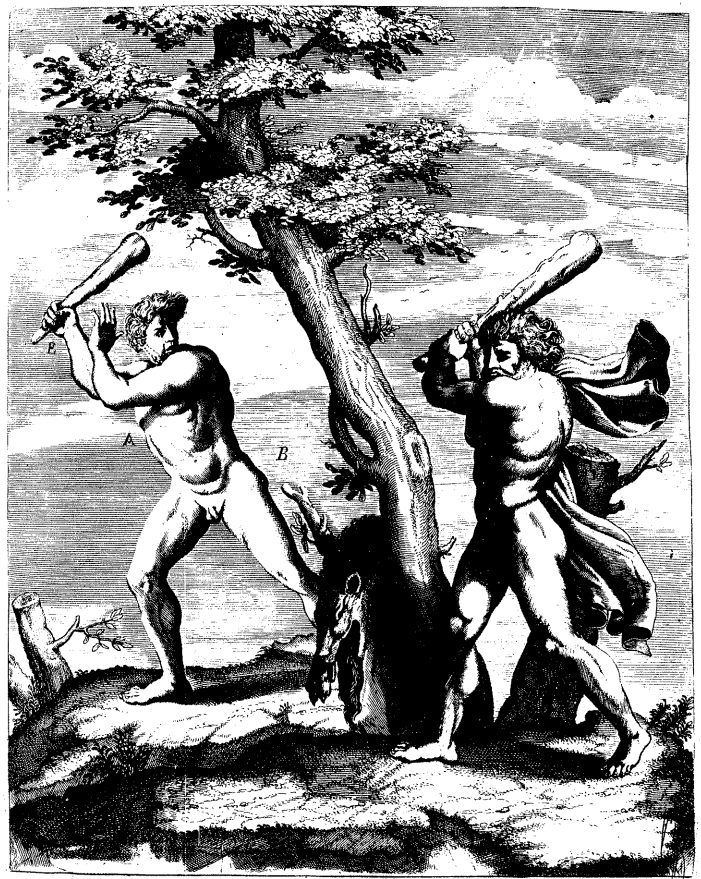

To The Honourable Collonell Robert Feilding of Feilding Hall in the County of Warwick

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Painting

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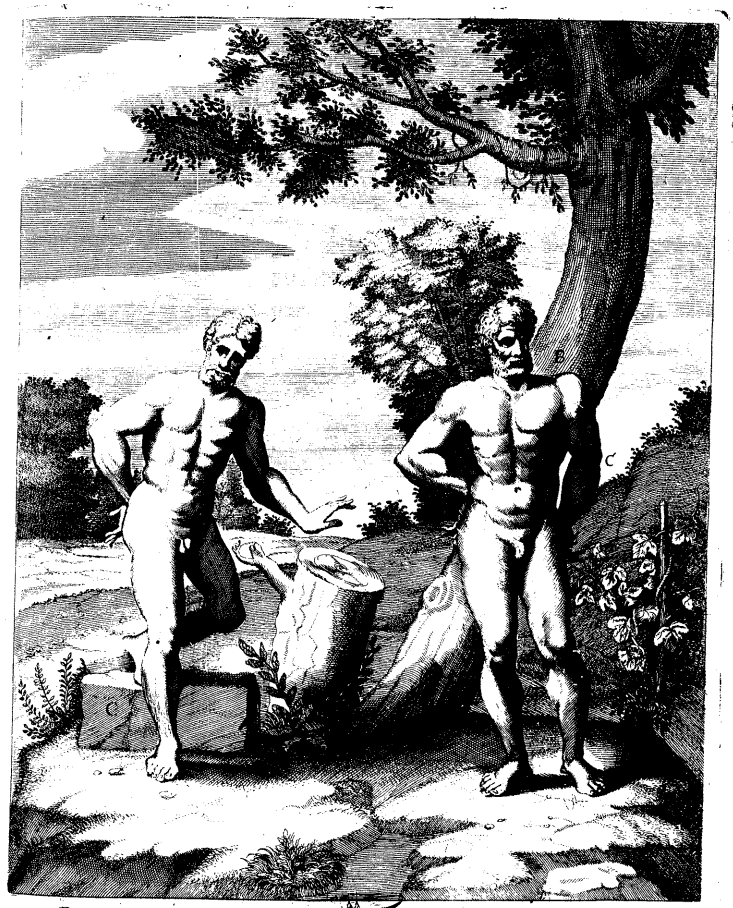

PAINTING

To the Worshipfull Edward Montague of
Horton in y^e County of Northampton Esqr
This Plate is humbly dedicated by Ric. Blome

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adding some of the darkest *Blue*, as *Indico* to the *Verditer*, or *Bice*. But where the *Light* shines only by *Reflection*, there only mix so much *Shadow* as to express that Counterfeit *Light*, losing it self (as it were) by degrees, always observing, that you make your *Light* and *Shadow* to agree. For this reason there must be more *Light* in fine *Draperies*, as those of *Taffety*, *Cambrick*, *Cypress*, and the like, in which the *Folds* must be small, loose, and waving, as if blown with the *Wind*, as appears by *Womens Garments*, which fall close to their *Bodies* on that side where the *Wind* bloweth, and raised up on the other side. And contrary-wise, Gross and Heavy *Shadows* are in stiff *Cloaths*; as of *Cloth*, *Plush*, *Velvet*, *Cloth* of *Gold*, and *Silver*, and the like; upon which the *Air* can have little or no force, so that the *Folds* are few, and gross. The *Folds* for *Stuffs*, and *Fine Cloth*, are (as it were) a Mean between *both*, and may be made as if moved by the *Wind*, like unto *Silks*.

CHAP. VI.

Of Colours; and the Ordering them.

HAving treated of *Draughts*, my purpose in the next place shall be to treat of the true Order, and Manner of the *Colours*; the Means to prepare them for the *Pencil*, and to cleanse them from their corrupt Mixture, wherewithal they are sophisticated, whereby the *Practitioner* may be able for their better Illustration to put them into apt and fitting *Colours*, as well for distinctions sake, as the delight of the Beholder; which is a full perfection of a *Picture*. For by the assistance of *Colours* (if Judiciously ordered) *Angry People* will look of a fiery, discontented Countenance, and the *Melancholy* of a pale Aspect: The same will appear in all sorts of *Beasts*, and *Fowls*.

The Definition of Colours, and how many Kinds there are.

ARistotle defineth *Colour*, to be a visible quantity limited in the Surface, or Extremity of a *dark Body*, which before it be *lightned*, is visible only in Possibility, and by the benefit of *Light* may be actually seen.

The Names of the Colours.

Whites: *Cerus*, *White-Lead*, *Slat-White*.

Reds: *India-Lake*, *Kermine*, *Vermilion*, *Red-Lead*, *Red-Oaker*.

Yellows: *Mastico*t, *Tellow-Oaker*, *Englisb-Oaker*, *Tellow-Otment*.

Greens: *Sap-Green*, *Green-Bice*, *Cedar-Green*, *Spanish-Green*, *Verditerra*,

Blacks: *Cherrystone*, *Lamp-black*, *Ivory*.

Blews: *Indico*, *Ultramarine*, *Bice*, *Smalt*, *Verditer*,

Browns: *Umber*, *Spanish-Brown*, *Terra-Dicoloria*, *Terra Lemnia*,

In this Account of *Colours*, I forbear to speak of *Verdigrease*, *Orpment*, and several others, as being unnecessary, or dangerous, by reason of their unnatural Quality, or else for their course and greasie *Body*, not suffered to accompany with the other *Colours*, as being of a more fine, subtile, and transparent Nature.

There are yet omitted divers other *Colours*, as *Saffron*, &c. (which are very good to be used) besides some others, which are Extractions from *Flowers*, *Juice* of *Herbs*, or *Roots*, which by reason of their Cheapness are esteemed fitter for those that wash *Prints* and *Maps*, than for *Limning*; yet of these, or the like Extractions, from *Flowers*, *Herbs*, &c. though they be esteemed of so small value, nevertheless they are exceeding good and pleasant; (if rightly extracted) There are also *Colours* which proceed from *Berries*, as *Bay-Berries*, *French-Berries*, &c. that make a good *Tellow*. Other *Colours* that are made of *Woods*, as *Brazil*, *Log-wood*, and the like, which make good *Reds*. I have also omitted other *Colours*, as *Purples*, *Murreys*, &c. by reason they are compounded and made of those aforesaid, of which I shall treat in a place more convenient.

WHITE-LEAD, or *FLAKEWHITE*, is better than *Cerus*, and less subject to Inconveniences, which may be mended as followeth.

CERUS will many times (after it is wrought) tarnish, starve, and dye; and that which you laid on with the *Pencil* for a fair *White*, will within a few *Months* become *Rusty*, *Reddish*, or incline to a *Tellow*.

White-Lead well ground (which it must be) will glister too much; if course ground, is unserviceable.

The *Remedies* against these Inconveniences is thus prevented: Before you begin to *Grind* them, set them (especially the *White-Lead*) in the *Sun* two or three Days to dry, which will draw away the Salt and Greasie commixture, that poysons the *Colours*; besides, you must scrape away the *Superficies* of the *White-Lead*, leaving only the middle part, which is the best. You must be careful of this *Colour*, it being the Ground of all the other *Work*, and the loss, or safety, as daily Experience teacheth.

The *Colours* being thus dryed in the *Sun*, grind them on a *Porphire*, *Serpentine*, or *Peble*.

When they are ground very fine (and that in some good quantity, only in *Water* without *Gum*) make ready a piece of thick *white Chalk*, wherein make certain little *Holes*, in every one of which put the *White* thus ground, and as soon as you have taken it off the *Stone* all wet as it is, let it remain till it dry, and you shall find that

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the *Chalk* will ſuck away the filthineſs, or greaſineſs, and the *Salt*, which is the greateſt ſpoil of this *Colour*. When it is throughly dryed, keep it in clean *Paper*, or *Boxes*, for your uſe.

When you would *Work*, take thereof as much as will lye upon a *Muſſel-ſhell*, and put to this *Colour* (as indeed to all others) a little *Gum-Arabick*, the *whiter* the better, which muſt be diſſolved in fair *Water*, (about two Ounces is enough to make a Pint of the *Water*) with which you are to temper your *Colours*. But *Verditer*, *Smalt*, *Bice*, *Red-Lead*, and ſome others, require a greater proportion of the *Gum* to a Pint of *Water*, as being of a more gritniſh and courſe Nature; otherwiſe they will not ſo well bind to the *Paper*, or *Vellum*. If you put too much *Gum* in the *Water*, the *Colours* will ſhine; and if too little, they will come off.

If you leave any *Colour* in the *Shell*, let it not be too Liquid, but ſomething Clammy; then cover it to keep it from *Duſt*, and ſo let it dry.

Some *Colours* are to be *Ground*, and ſome *Waſhed*; thoſe to be *Ground*, muſt be uſed as aforeſaid.

Colours to be *Ground*.	*Colours* to be *Waſhed*.
Cerus.	*Red-Lead.*
White-Lead.	*Smalt.*
Indico.	*Blue-Bice.*
Indian-Lake.	*Ultra-marine.*
Engliſh-Oker.	*Verditer.*
Pink.	*Maſticot.*
Spaniſh-Brown.	*Cedar-Green.*
Collens-Earth.	*Green-Bice.*
Ivory.	*Sap-Green* is to be ſteeped in *Gum-water* only.
Umber.	
Cherry-ſtone.	

INDIA LAKE muſt be *Ground* as the reſt, and temper it in your *Shell* with *Gum-water*; and to avoid the cracking, and flying from the *Shell*, which this *Colour*, *Umber*, and ſome others, are ſubject unto; Take a little fine *Powder* of *White Sugar-Candy*, and with it, and a little *fair Water*, temper the *Colour* over again with your *Finger*, until the *Candy* be diſſolved.

It is an excellent *Crimſon Colour*, and very good to ſhadow *Vermillion* withal, as alſo the deep *Shades* of *yellow Garments*. It is a good *Sky-Colour*, if you mix ſome *White-Lead* with it; alſo it makes good *Fleſh-Colours*, by adding thereto ſome *White*, *Red-Lead*, and *Engliſh-Oker*, as hereafter ſhall be treated of. But by reaſon of the Dearneſs, you may uſe *Couchaneil*, or *Couchaneil-Cakes*, which are to be ſteeped in *Gum-water*, and the Juice or Liquor that comes from them makes the *Colour*. Alſo *Red-Ink* made of *Brazil*, will make a pretty good *Red* for ordinary uſes.

VERMILLION is a fair and perfect *Scarlet-Colour*; and if you would have it good, buy it Unground, or ſee it Ground, otherwiſe they will ſpoil it, by putting thereto *Red-Lead*; and to make it bright put in ſome *Clarified Honey*. This *Colour* is chiefly for *Garments*.

RED-LEAD makes a good *Orange-Colour*, by putting thereto a ſmall quantity of *yellow Berries*. This *Colour* is uſed for *Buildings*, and *High-ways*, in *Landskips*, being mixt with a little *Cerus*. It is alſo uſed to Colour any *Light Ground* in a *Picture*; But take only the thin *Water* of it. This *Colour* is of great uſe for the *Shadows* in *yellow Garments*, it is very good to make *Fleſh-Colours*, as alſo for ſeveral other occaſions in *Miniature*.

ENGLISH-OKER ſerves for the *Life*, *Draperies*, the *Hair*, *Rocks*, and for the *High-Ways* in *Landskips*: It lieth well in the *Shell* if fine Ground.

PINK muſt be the fineſt you can get, becauſe with it, and *Blue-Bice*, you are to make your faireſt *Greens* for *Landskips*, and *Draperies*; for the *Colour* of *Green-Bice*, and the tranſparency of *Sap-Green*, *Spaniſh-Green*, &c. doth make them in many things unſerviceable; eſpecially where you have occaſion to uſe beautiful *Greens*, which at your pleaſure you may make *Light*, or *Sad*, by mixing a little *Indico*, or *Bice*, with the *Pink*.

UMBER is not to be uſed, unleſs burnt in a *Crucible*, and being well Ground it worketh well. It is a good *Colour* for the *Hair*, as alſo for the *Shades* of the *Bodies* of *Trees*, &c. It is the beſt and brighteſt *Colour* when burnt, as aforeſaid; but if you would colour any *Beaſt*, it muſt not be burnt. It is alſo uſed for the *Bodies* of *Trees*, *Boards*, or the like *Wooden* things, as alſo the *Dark-ground* in a *Picture*.

SPANISH-BROWN is a courſe *Colour*, yet of great uſe for Shadowing *Vermillion*, or to lay upon any *Dark-ground* behind a *Picture*, or to Shadow *yellow Berries* in the Darkeſt places; but inſtead of this you may uſe *Umber*, which mix with *Red-Lead*, and a little quantity of *Lake* makes the ſame *Colour*.

COLLENS-EARTH worketh well when it is new Ground, and is eſpecially to cloſe up the laſt, and deepeſt Touches in the *ſhadowy* place of *Pictures* by the Life.

CHERRY-STONE, and *IVORY-BLACK*, are both to be burnt in a *Crucible*. *Cherry-ſtone Black* is very good for *Draperies*, and *black Apparel*; but if you uſe it to make a *Satin*, it muſt be tempered with a little *white India-Lake*, and *Indico*, but only to make it appear with a beautiful Gloſs, which heightned with a little Lighter mixter of a more *Whitiſh* in ſtrong Touches, and hard Reflexions, and deepned with *Ivory*, will ſhew very fair.

Ivory ſerves for a *Velvet Black*, and is not eaſy to be wrought with, unleſs Tempered with *Sugar-Candy*, to keep it from Cracking. Note, that you never put any *Black* amongſt your *Colours* to make them *Dark*, for that will make them ſeem dirty; but *Black* may be permitted for a *Shadow* to *Spaniſh Brown*.

BLUE-BICE is an excellent *Colour*, if well waſhed, as hereafter ſhall be ſhewed, which will ſerve in ſtead of *Ultramarine*. With this you may make divers *Colours*, as *Purples*, *Greens*, &c. This *Colour* doth make a light for *Ultramarine*; may you may uſe it for a *Shade*, and for the *Lights* add white *Cerus*, by which you may make it as light or

or as deep as you pleaſe, by the greater or leſſer quantity of *Cerus*. This is alſo a *Shadow* for *Blue Verditer*.

ULTRAMARINE is a dear and precious *Colour*, and not fit for ordinary Uſes; but if you would beſtow Pains, and Curioſity in your Piece, then uſe it.

SMALT makes the ſame *Colour* as *Ultramarine*, but it is a Courſe, and gritiſh *Colour*; therefore chooſe the fineſt, and waſh it well.

BLUE VERDITER is a light *Blue*, and very apt to loſe its *Colour*; therefore not good, except for *Greens*.

INDICO is a dark *Blue*, and uſed moſt for *Shades*; it is very good to *Colour* the *Waves* of the *Sea*.

MASTICOT is a light *Yellow*, and very good for *Garments*, but chooſe the fineſt, and let it be well waſh't: There are ſeveral ſorts of *Maſticots*, as *Light* and *Sad*.

LITTMOSE is a very fair *Blue*, it is to be ſteeped in *Sope-Lees*, in which it will diſſolve, and make a Fine *Azure Colour*, with which *Water* you may *Diaper*, and *Dammask* upon all other *Blues*; as alſo upon *Sanguines*, to make them ſhew more Fair and Beautiful; and when this *Blue Water* is dry, you may moiſten it as often as you pleaſe with more of the ſaid *Water*.

TELLOW BERRIES is of that great Uſe, being of ſo Bright a *Colour*, and Tranſparent a quality, that it is fit for all Uſes. Theſe *Berries* are to be ſteeped in *Alome Water*, and are made *Lighter* and *Darker* by the leſs quantity of *Water*, and the greater of theſe *Berries*. This *Tellow* being of a Thin *Body*, is moſt fit for *Waſhing Prints*.

CAMBOGEUM is an excellent *Tellow*, being of a Tranſparent, and bright quality; it is diſſolved in Fair *Water*; of this, as alſo of *Tellow Berries*, are made exceeding fair and pleaſant *Greens*; It is alſo good to brighten *Vermillion*, a ſmall quantity being mixt with it.

SAFFRON is a deep *Tellow*, and fit to *Shadow Cambogeum*, and *Tellow Berries*. It is ſteeped in *Gum Water*, or elſe in *Fair Water* made warm, being ſet on a moderate Fire, and ſo uſe it hot, which is beſt, for when it is cold, it will not work half ſo well, neither is the *Colour* ſo good; this *Colour* is alſo only fit for the waſhing *Prints* and *Maps*.

You may make ſuch a like *Colour* with *Red Lead*, and *Tellow Berries*.

GREENS are generally made of ſeveral *Colours*, as for Example, *Cambogeum*, or *Tellow Berries* mixt with *Blue Verditer*, makes a Fair light *Green*; for a darker inſtead of *Verditer* put in *Bice* or *Ultramarine*; and for the darkeſt of all, uſe *Indico*. Alſo for a Fair and Tranſparent *Green*, uſe diſtilled *Verditer*, or *Verdigreace* boiled in *Vinegar*; which you may make as light as you pleaſe, by putting therein *Tellow Berries*, or *Cambogeum*.

Of theſe you may make about 20 ſeveral *Greens*, lighter or darker as you pleaſe, by the Addition of more or leſs of the *Blues*.

Alſo *Pink* is very good to make *Greens*, eſpecially the *Graſs-Green*; the *Shade* is made with *Pink* and *Indico*.

FRENCH GREEN is made of *Pink* and *Indico*, the *Shade* is *Indico*.

POPINJAGREEN is made of *Pink* and *Indico*, but a greater quantity of *Pink*.

SEA GREEN is made of *Bice*, *Pink* and *White*, it is Shadowed with *Indico*, and in this nature you may make ſundry ſorts of *Greens* according to your uſe.

There are ſeveral other ſorts of *Greens*, I ſhall only name them.

SAP-GREEN is a dirty dark *Green*, and of little uſe, except to Shadow in the dark places; but *Tellow Berries* and *Indico* do make the ſame *Colour*, and far better. This *Colour* is to be ſteeped in *Vinegar*, and ſo uſed.

SPANISH-GREEN is very good and pleaſant *Green*, it muſt be ſteeped in *Gum-Water*, letting it ſtand in ſome warm place for 20, or 30, Days, this is good for *Trees*, being of a ſhining nature; it is of a *Blewiſh Colour*, *Tellow Berries* or *Cambogeum* being mixt with it, makes it better; but do not mix any *Tellow* in it, but only as you uſe it, ſo that you may make it as light as you pleaſe, for the light Shades, it ſerving of it ſelf for the dark ones. This *Colour* is Poyſon, ſo that care ought to be taken in uſing it. It is very good to be uſed in *Landskips*, in thoſe places that ſeem a great diſtance off. *Blue Verditer* doth almoſt make the ſame *Colour*, but not ſo Tranſparent, therefore not ſo good.

COPPER-GREEN is alſo a Tranſparent and *Gloſſy Colour*, it is thickned on a gentle Fire. It is moſt uſed for *Waſhing Prints*, being very good for *Trees*, or *Graſs*, it being of ſo perfect a *Graſs-Green Colour*.

SPANISH, or *FLAKE WHITE* is the beſt *White*, if it be good and well ground; this being added to any other *Colour*, doth make it become lighter, ſo that the *Colour* it ſelf may be the Shade; as by puting this *Colour* to *Indian Lake*, is made a *Bluſh*, ſo likewiſe to *Ultramarine* or *Bice*; for it is not only of uſe to make *Lights* to them, but alſo to make them go far.

For as much as there is a natural *Concord*, and *Diſcord* between the *Colours* themſelves, inſomuch that if ſome *Colours* be mixed, will ſuddainly ſpoil each other; I think it convenient to ſet down ſuch as agree together, by which with the Practitioners Experience, may ſoon arrive to the mixture thereof; not that I intend to limit out the exact quantity of *Colours* to be mixed, being but to ſhew that *Colours* ſerve for the true expreſſing of all Natural things.

Colours that are Compounded and made of others.

CArnation, is made of *Lake* and *White*; the *Shadow* is *Lake*.

Scarlet, is *Vermillion*, and the *Shadow*, *Lake*.

Violet, is made of *Bice*, and *Lake*, the *Shadow Indico*.

Purple, is made of *Lake*, *Bice*, and *White*; the *Shadow Indico*, and *Lake*.

Skie-Colour, is *Bice*, and *White*; the *Shadow Bice*.

Aſh-Colour, is made of *Lamb-Black*, and *White*; the *Shadow Lamb-Black*.

Straw,

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Straw-Colour is made of good quantity of *Fink*, *Saffron*, *White*, and *Vermillion*; the *Shadow Lake*.

Orange-Tawny is made of *Vermillion*, or *Red Lead*, *Masticot* and *Pink*; the *Shadow Lake*.

Light Hair-Colour is made of *Oker*, *Umber* and *Black*; the *Shadow Umber* and *Black*.

For changeable *Silk*, the *Water* of *Masticot*, and *Red Lead* for the *Lightning*, and deepen the same with *Sap Green*.

Also a *Light Blue* lightned with *White*, and deepned with *Lake*.

For *White Satin*, *Flake White*, or fine *Cerus*, deepned with *Cherystone Black*, hightned again with the said *White* where the Light doth fall.

For *Black Satten*, *Cherystone Black* and *White*, deepned again with *Cherystone Black*, and lastly, with *Ivory Black*.

For *Black Velvet*, lay your *Garment* over with *Ivory Black*, and then highten it with *Cherystone Black*, with a little *White*.

For *Cloth* of *Gold*, use *Brown Oker*, and *Liquid Gold Water*, heightning the same with small *Streaks* of *Gold*.

Out of *Masticot*, *Umber*, *Flake-White*, or *Cerus*, *Tellow-Oker*, *Spanish-Brown*, *Red-Oker* and *Black*, are made all sorts of *Hair-Colours*.

To make a *Peach-Colour*, take *Brazil Water*, *Logwood Water*, and *Flake-White*, or *Cerus*.

To make a *Crane Colour*, mix the said *White* with *Blue*. This *Colour* is also made with *Black Lead*, being ground with *Gum-Water*.

Vermillion and *Lake* makes the colour of a ripe *Strawbery*, and a *Red Rose*, and by adding a little *White*, makes it a *Damask Rose*, and by a greater quantity of *White* a *Blush Colour*.

All these, and the like *Mixtures* are lightned, darkned, or diverstly varied according as they are mixed; that is, in a *Mixture* of 2 or 3 *Colours*, that of which there is, the greatest part will *Predominate*; also *White* being more or less added to any *Colour*, doth much vary, and alter them, as well as lighten them.

In this Nature, by your Practice you may know how to mix and compound all other *Colours* you have use of.

Flesh Colours are thus made; for a fair *Complexion* use *White*, a little *Lake*, with a little *Red Lead* mixt together; it may be made as light, or as red as you please, by putting thereto more or less *White*. The *Shadows* of the Face, as the *Cheeks*, &c. are made by adding a little more *Lake* and *Red Lead*. If you would have it of a swarthy Complexion, to distinguish a *Moss* from a *Womans*, add a little *Tellow Oker*; and for the *Shadow* put in a little more *Lake*, with a small quantity of *Burnt Umber*.

To make Colours *for the* Sky.

TAke light *Masticot*, for the lowest and highest places *Couchaniel*, or *Red Ink* not thickned, and *White* for the next Degree, *Blue Bice* and *White* for the next, and for the highest of all, *Blue Bice*, or *Ultramarine*; all these must be so laid on, and incorporated one into another, that you may not receive any sharpness in the edge of your *Colour*, or to perceive where you first began to lay them on, as being so mixed one into another.

For the *Colour* of the *Clouds*, *Blue Verditer* may sometimes be used, and *White Shadowed* with the said *Verditer*: Sometimes *Lake* and *White*, or *Red Ink* and *White*, *Shadowed* with *Blue Verditer*; and sometimes light *Masticot*, *Shadowed* with *Blue Verditer* or *Bice*.

What Shadows *ought to be used to every* Colour.

BUt by the way, take this for a General Rule; That every *Colour* is made to *Shadow* it self, either by taking the thinnest of the *Colour*, which serveth for the light, and so to *Shadow* it with the Thick; or else by mixing thereto a little *White* for the light, and so *Shadow* it with the *Colour* it self: But if you would have your *Shades* to be darker than the *Colour* it self, for the deep and hard *Shades*, then follow these Instructions.

Lake is not to be *shadowed* with any other *Colour*, it being the darkest and deepest *Red*; but for Variety, you may *Shadow* it sometimes with *Ultramarine*, *Bice*, or *Verditer*, which will make it shew to be changeable *Taffety*; and by adding thereto some *White*, you may make several Lights.

Vermillion, is *Shadowed* with *Lake*, *Spanish Brown*, or *Couchaneil Cakes*.

Red Lead, is *Shadowed* with *Spanish Brown*.

Red-Oker, is *Shadowed* with *Lake*.

Umber, is *Shadowed* with some *Black* mixt with the *Umber*.

Spanish-Brown, is *Shadowed* with thin *Black*; but it is not of use in bright *Garments*.

Black, is not to be *Shadowed*, with any other *Colour*, but for Lights use it thinner.

Blue Verditer, is *Shadowed* with *Bice*, *Ultramarine*, or thin *Indico*.

Blue Bice, is *Shadowed* with *Ultramarine*, and in the deepest places, with *Indico*.

Ultra-marine is a very deep *Blue*, and not to be used but for *Shades*: There may be *Lights* made of it, as before shewed, by adding to it some *White*.

Smalt is a deep *Blue*, and chiefly used for *Shades*; but it may be Shadowed with *Indico*.

Indico is only fit to *shadow* other *Blues* with.

Masticot is to be *shadowed* with the thin Water of *Red-Lead*; and is also *shadowed* with *Saffron*.

Tellow-Berries are naturally *shadowed* with *Umber*; but for the better Beauty, it is *shadowed* with *Red Lead*, or *Saffron*, and in the deep places with *Spanish Brown*, or *Lake*. Sometimes for varieties sake it is *shadowed* with *Blue Verditer*, or *Bice*; and sometimes with thick *Copper Green*, or indeed with any other bright and pleasant *Colour*.

Cambogeum is to be *shadowed* with the same *Colours*, as the *Tellow-Berries*.

Saffron is *shadowed* with *Lake*, or thick *Red Ink*.

Tellow Oker is *shadowed* with *burnt Oker*.

Copper-Green is *shadowed* with *Indico*, and *yellow Berries*, or else with *Sap-Green*.

Spanish Green is *shadowed* with *Copper Green*.

Green

Green Verditer, is *shadowed* with *Copper-Green*, and in the darkest places with *Sap Green*.

Sap-Green, is only used to *shadow* other *Greens*. There are several other *Greens* as hath been treated of, which I shall here omit.

Cerus, *White-Lead* or *Flake-white*, are *shadowed* which a small quantity of *Black*, mixt therewith, or a *shadow* is made with some *Blue-Bice*, and *white*.

Thus having given you the *shadows* to every *Colour*; in the next place, I shall proceed to such *Colours* that set off best together.

What Colours *set off best together.*

REds set off well with, *Greens*, *Tellows*, *Whites*, and *Blues*; but best with *Blues* and *Tellows*. They set off not well with *Purples*, *Blacks* or *Browns*.

Blues set off well enough with *Tellows*, *Browns*, *Reds*, *Whites*, and *Blacks*. They set off best with *Reds*, *Browns*, and *Whites*. But not well with *Purples* and *Greens*.

Tellows set off well with deep *Blues*, *Reds*, *Browns*, and *Purples*; they set off not well with *Whites*, *Blacks* or light *Greens*, but best with *Reds*, and *Blues*.

Greens set off well with *Reds*, *Browns*, and *Purples*; they set off best with *Reds* and *Purples*, but not well with *Whites*, *Blacks* and *Blues*.

Browns set off well with no *Colour*, but worst with *Black*.

Blacks set off well with any *Colour*, except *Browns*.

Whites set off well with all *Colours*.

How to make Changables.

CHangables are such kind of *Paintings* whose *Lights* are of one *Colour*, and their *shadows* of another; which is very delight-ful to the *Eye*, by reason of the Variety of *Colours* therein used, according to the several Degrees of *Light*, which are commonly three; In the first whereof Simple *White* is used alone for the *Light*.

In the first Degree *White* may be *shadowed* with faint *Tellow*, *Pink* mixt, *Light Green*, *Light Blue*, *Light Purple*, *Light Ash-colour*, *Flame Colour*, *Light Tawny*, and *Light Red*.

In the second Degree the *Light Colours*, that serve for *shadows* (in the first Degree where the *Lights* of *Changables* are,) *White* must be *shadowed* in this sort, with deeper *Colours*, as with *Purples*, *Straw-colour*, *Oaker*, *Sad Ash-colour*, *Tawny*, *Bice*, *Pink*, *Vermillion*, *Red-lead*, and *Spanish-brown*.

And in the third Degree those *Colours* which serve for *shadows* in the second Degree, are again *shadowed* with other deeper and darker, as *Umber*, *Lake*, *Indico*, *Smalt*; and lastly, as *White* hightneth them, so doth *Black shadow* them.

In the next place, I shall give you some directions for the Grinding and Washing of your *Colours*.

Grinding of Colours.

COlours are to be Ground upon a *Peble stone*, or some other that is hard, for the hardest is the best; then Grind them with fair *Water* without *Gum*, and when they are very Fine Ground, put them upon a *Chalk-stone* to dry, and reserve them in *Boxes*, or *Papers* for your use.

Washing of Colours.

THe reason why *Colours* are to be washed, and not *Ground*, is because they are of so sandy, loose, and gravelly a Quality, and of so heavy, and Solid Bodies that they can hardly be reduced to the fineness by Gringding as is required; besides that way they presently become starved and dead; and *Masticot* and *Red Lead* becomes greasy, clammy, and utterly unserviceable. But to proceed.

Take an *Ounce* or two of *Read Lead*, put it into an *Earthen-dish* full of pure *Water*, stir it for a while together with a *Spoon* till the *Water* be all Coloured, then let it stand a little, and there will be on the *Water* a greasy Scum, which together with the *Water* cast away, then fill the *Bason* with *Fresh Water*, and stir it as before, till the *Water* be thick and troubled, which done, before it be half settled pour it out into another *Dish*, reserving behind in the other *Bason*, the Dregs and setling of the *Colour*, which cast away, for you are to seek not much, but good; if a Pound of it will yield 2 or 3 *Shells* of fine *Colour*, it is sufficient. The troubled, and *Coloured Water* being cast into the second *Dish*, put more *Water* to it, and wash it as the former, then let it settle until it be clean, and so pour off the *Water*, washing it again and again, if any Scum arise you may make 4 or 5 sorts, still pouring half the thickned *Water* into other *Dishes*, and washing them as aforesaid; when you have washed it enough, and the *Colour* is quite settled, pour off the *Water*, and let the fine *Colour* dry; then with a fine *Feather* take off the finest part of the *Colour*, reserving it for your curious Works, and the other for that which is more course. You must temper them with *Gum Water* for your use, as aforesaid. What is said for washing *Red Lead* may be said for the washing all other *Colours*.

Rules for the tempering of your Colours.

1 IN *Tempering*, or Mixing your *Colours* have a great care not to put your *Pencils* out of one *Colour* into another, for that will make them dirty, and Spoil them; for prevention of which, have by you at your working a *Poringer*, or *Pan* of Fair *Water* to wash your *Pencils* in, when you have done with any *Colour*, so that it will be clean to put into any other.

2. In Mixing your *Colours*, stir them about well in the *Shell*, with your *Pencil*, before you Mix them together, for the Thick is not good as well as the Thin, but let the *Water* be well *Coloured*, and all of a thickness; then pour them into a *Shell* together; but first pour in your lightest *Colour*, by which you will know how much of the *Sad* will serve your turn.

3. In Mixing your *Colours* be careful that you make it not too *Sad*, for then it is hard to recover it without spoiling; therefore when you have occasion to Mix any *Sad Colour* with those that are *Light*, put in but a little and a little of the *Sad Colour*, until you find it *Sad* enough for your

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purpose; but if it be too *Light* you may make it as *Sad* as you please, by adding the greater quantity of *Sad Colour* thereunto.

4. *Black* is unfit to be Mixt with any *Colour*, except *White*, by reason of its unpleasantness, making all other *Colours* dirty.

CHAP. VII.

Rules for laying on your Colours.

LAy on your *Colours* so smooth with your *Pencil*, that they may be all of one thickness; for to lye thick in one place, and thin in another is odious; therefore you ought to have a quick hand to lay them smooth before they dry, for being once dry 'tis hard to make them smooth; and to that end take your *Pencils* pretty full of *Colour*, especially when you are to cover a *Garment* all over; (otherwise not) for by this means you may be the better able to lay them smooth.

Some *Colours* are harder to lay on than other, as *Red Lead*, *Bice*, *Verditer*, *Smalt*, &c. as being of a more Sandy and gritty nature, so that the greater care ought to be taken therein.

Always lay on the *Lightest Colour* first, and then proceed to the *shadows*.

Directions for bestowing your Lights.

LEt all your *Lights* be placed one way in the whole Work; as if the *Light* falls side ways on your *Picture*, and you must make the other side, as being farthest from the *Light* darkest, and so let your *Lights* be placed altogether on the one side, and not in confusion, as by making of both sides alike Lightned, as if it stood in the midst of many *Lights*, for the *Light* doth not with all its brightness illuminate any more than that part, which is directly opposite to it.

Another Reason is taken from the Nature of your *Eye*; for the first part of the Body coming thereunto with a bigger *Angle*, is more distinctly seen; so likewise the second part being further off, comes to the *Eye* in a lesser *Angle*, and being lesser lightned is not so plainly seen as the first. By this *Rule*, if you are to Draw two or three *Men* standing together, one behind another, although all of them receive equally the *Light*, yet the second being farther from the *Eye* must of necessity be made darker than the first, and the third most dark.

That part of the *Body* that standeth farthest out must be made lightest, by reason it cometh nearest the *Light*, and the *Light* loseth so much of its brightness, by how much any part of the *Body* bends inwards; because those Parts that stick out do hinder the brightness of the *Light* from those Parts that fall more inward: Therefore how much one Part of the *Body* sticks out beyond the other, it must be made so much lighter: and if it falls more inward, it must be made so much darker. Also, that Part of the *Body* must be made lightest that hath the *Light* most directly opposite to it; as if the *Light* be placed above the *Head*, then the Top of the *Head* must be the lightest, the *Shoulders* less light, and so losing by degrees.

Sattins, *Silks*, or the like bright *shining Stuffs* which have certain bright Reflexions exceeding *Light*, sudden bright Glances, especially where the *Light* falls brightest; and so the *Reflexions* are less bright, by how much the *Garment* falls more inward from the *Light*.

Directions about choosing Pencils.

LEt your *Pencils* be clean, sharp Pointed, not cleaving in two, but full and thick next the *Quill*, and so descending into a round and sharp *Point*: If you find any one *Hair* longer than another, take it away with the *Flame* of a *Candle*. You can't be without two Dozen of *Pencils* at the least for all your *Colours*, and their *Shadows*.

Those *Pencils* that you use for *Gold* and *Silver*, keep them only for that purpose.

CHAP. VIII.

The Table to Work on, for Miniature; *with the Manner of Working.*

LEt it be an ordinary plain *Card*, or a pure thick and smooth *Velom*; Polish them well, and with thin *white Starch* paste on it a piece of an *Abortive*, the outside outwards, and when it is dry. Polish it as followeth: Make clean your *Grinding-Stone*, and lay the *Table* the *Parchment*-side downwards on it, and so Polish it with a *Tooth* on the Backside, and then that side that is towards the *Stone* will be very smooth, and good to Work on.

Lay on your *Card* thus prepared, a *Primer* of *Flesh Colour*, before you begin to *Work*, tempered according to the *Complexion* of the Party whose *Picture* you are to Draw. If *Fair*, you may temper the *Complexion* with *White*, *Lake*, and *Red Lead* mingled together to a pretty quantity; but if your *Complexion* be *Brown*, then mingle with the *White* and *Red* a little fine *Masticot*, or *English Oker*, or both; but be sure this *Ground*, or *Primer*, be fairer than the *Complexion* of the Party whose *Picture* you Draw; for you may darken it in *Limning*, but not lighten it, for the general way is to *Work* them down whole.

The *Ground* thus tempered, lay on the *Card* with a greater *Pencil* than ordinary; but lay it on smooth and clean from *Spots*, *Hairs*, or *Dust*. Remember to fill your *Pencil* full of *Colour*, and rather thin and watrish, than thick; and with two or three *Sweeps* lay it on very quick, and cover rather more than less, lest you

you be not able to follow the same *Colour* afterwards. Besides, if you be long in laying on the *Ground*, the *Abortive* will become rough, and rise from the *Card*.

Next, take a pretty large *Shell* of *Mother of Pearl*, and before you begin to *Work*, temper certain little heaps of several *Shadows* for the *Face*, and lay them handsomly severed about the Borders of the *Shell*. Some temper them as they Work them; but this Way is more Methodical, and will save you more *Labour* in Working.

First then, remember that in all these *Shadows* you mingle some little *White*, for the *Red* in the *Cheeks*, *Lips*, &c. temper *Lake*, *Red Lead*, and a little *White* together, for the *Blue Indico* and *White*: But note, that neither *Bice*, nor any *Black*, is used in the *Face*.

For the fine Bluish and Grayish *Colours*, which are the fainteſt and weakeſt *Shadows*, take *White*, a little *English Oaker*, and a little *Indico* (and if you will) add a little *Masticot*, or *Pink*, which will give that *Shadow* a good Grace, so it be not too *Green*; for the deeper *Shadows*, *White English Oaker*, and *Umber*; and for the dark and hard *Shadows* in many *Pictures* use *Lake*, and *Pink*, mixt with *Umber*; they make an excellent and *Fleshy Shadow*. The varieties of *Shadows* are so great, that no certain Rule can be given for them, your own Discretion and Observation of the *Life* must be your best Guide.

The Light to Work by.

LEt it be somewhat *Clear*, and *Darkish*, with soft and gentle *Reflexions* upon the Party you Draw; for hard and bright *Lights* make hard and unpleasant *Shadows*. Let your *Light* (if conveniently you can) be towards the *North*; let it be high, and let the *Shadows* fall sloping downwards, rather than traverse; for so your *Work* will be rounder and fairer. Place your self to your desire, that the *Light* may strike side-long from the Left-hand to the Right; and observe, that in all your *Work* it will shew to the best advantage, being turned and seen to the same *Light* it was wrought to. Let a *Saucer* of clean *Water* be always on your Right-hand wherewithal to wash your *Pencils*, together with a dry *Brush-Pencil* to cleanse your Work from *Dust*, and a sharp *Penknife* to take away such *Spots*, or *Hairs*, as may mix with your *Colours*. You may likewise cover your *Picture* with a small *Paper*, whereon to try your *Pencil* before you begin.

All things thus accommodated, Draw the *Lines* or *Perfile* of the *Face* very faint, with *Lake* and *White* mixt, for you may mend it then with a stronger *Stroak*. The *Line* thus Drawn (in which be exact) observe the deeper and more remarkable *Shadows*, and with some faint Colour of *Lake* and *White*, give some slight Touches somewhat roughly of those *Shadows* for your better Memory.

The *Lines* of the *Face* thus Drawn somewhat sharp and neat, Draw out the fashion and posture of that Part of the *Body* that you intend to add to the *Face*, which commonly is not lower than the *Shoulders*. And this you may Draw with a *darker Colour*.

CHAP. IX.

The first Sitting, and Lead-Colouring.

AT the first only Dead-colour the *Face*, not medling with *Hand*, or *Apparel*. This first Sitting will take up three or four *Hours*, to be exact; the second Sitting will take up four or five *Hours*; for in about that time you are to go over the *Face* curiously, observing whatsoever may conduce to the likeness (which is the principal thing;) or the Judicious Colouring and Observation of the several *Graces*, *Beauties*, or *Deformities* of the *Face*, as they appear in Nature; or else in close, sharp, neat, elegant Workmanship, with sweetness of the *Shadows*, and smooth Touching of the *Colours*.

The third Sitting is commonly a *Work* of about two or three *Hours*, and is spent in closing what was before Imperfect, and Rough; but principally in giving to every deep *Shadow* the strong Touches and Deepning, as well in the dark *Shadow* of the *Face*, as in the *Eyes*, *Eye-Brows*, *Hair*, &c. and these Touches and Observations are always the last part of your business, and never to be done until all the *Apparel*, *Hair*, &c. be finished; for this being done with Judgment, added exceedingly to the *Life*, and roundness of the *Picture*.

Of Lead Colouring.

Lead Colouring, must be done the roughest and boldest of all; having Drawn the *Face* with *Lake* and *White* as aforesaid, take the said *Colour* with *Vermillion*, Tempering it to the *Colour* of *Red* in the *Cheeks* and *Lips*, but very faintly; for remember that both in this and in all *Colurs* of *Limning*, you may add when you please, to make your *Colour* Deeper or Stronger, but never make your *Colour* too deep; for then you can hardly help it, without spoiling or defacing your *Picture*; because, as I have said, you never lighten in this *Art*, except the two specks in the *Eyes*, and a little of the *Hair*. The first *Colour* you are to begin the *Face* with, is the *Reds* of the *Cheeks* and *Lips* somewhat strongly, the bottom of the *Chin*; if the party be *Beardless*, over and under the *Eyes* you will perceive a delicate and Faint *Redness*, and underneath the *Eyes*, inclining somwhat to a *Purple Colour*, which in Fair and Beautiful *Faces* is ordinary, and must be carefully observed. The *Ear* is commonly *Reddish*, and sometimes the *Roots* of the *Hair*; all this you must work after the manner of *Washing*, or *Hatching*, drawing the *Pencil* along, and with Facility and gentle Stroaks, rather washing and wiping it, than

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than with pricks to pick it,as many affect to do: But the manner of working must be the Fruit of your own Industry; for now Rule can be prescribed for it, beyond your natural Dexterity.

To conclude, in your *Dead Colouring*, wash over and cover your Ground,and Complexion with this *Red*, and the following *Shadows*,not coming to be exact, but rather bold and judicious; for though it be never so rough at the first, yet its in your power to make it neat in the close. The *Red* being thus done, the next *Work* is the Faint *Blues*, about the Corners of the *Eyes*, and the *Grayish* and *Bluish Shadows* under the *Eyes*; and about the *Temples*, which in like manner you are to work, from the uppermost part of the Face, almost all over, but exceeding Faint, by degrees sweetning your *Shadows*, or deepning it as the Lights fall hard or gentle. In going over the *Face*, be sure to make out the hard *Shadows* in the dark side of the *Face*, under the *Nose*, *Chin*, and *Eye-brows*; and as the Light falleth with somwhat strong Touches in these places, bring up your *Work* together into an equal roundness, not giving Affection to any particular part of the *Face*, but rising all the parts curiously; by which means you will better observe the *Likeness*, *Roundness*, *Posture* and *Colouring*. The Fainter and Lighter *Shadows* being done, and somwhat smoothed and wrought into the *Red*, you may go over the *Hair*, disposing of it into such Foldings, as may best become the *Picture*. You must at the first only draw them with *Colour*, as near as you can sutable to the Life, and after them roughly as the rest; and then once more peruse your *Work*, and fill up the bare and empty places, which are uncovered with *Colour*; and for a parting Blow, deepen it more strongly than before, still carefully observing the Life, and deepen not too fast, but by degrees.

CHAP. X.

The Second Sitting.

THe *Second Sitting* will take up 5 or 6 *Hours*, more or less as you intend to bestow pains; the *Party* being set just in his former *Posture*,you are most exactly to observe, and more curiously with your *Pencil* to draw the several Delineaments, and Varieties of Nature, which before you had rudely Traced out, wherein there can be no more said but this; that you must use again the same *Colours*,in the same places you did at the first, working and sweetning the same one into another, that nothing be left in the *Work* with a hard Edge, or uneven; sweeten them with somwhat a sharper *Pencil* than you did at the first, that your *Shadows* may be soft and smooth, being dispersed, and gently extended in and towards the lighter part of the *Face*, like Vapour or Smoak. But be sure when you have proceeded thus far, you are carefully to observe the aforesaid *Shadows* and *Colours*, and by little and little, *Work* them over into one another; when you have wrought an Hour or two, it will be time to lay your *Ground* behind the *Picture*, to *Colour* the *Apparel*, and what else you please.

The *Ground* behind the *Picture* is commonly *Blue*, or *Crimson*, something like *Sattin*, or *Red Velvet Curtains*; If *Blue*, first wet the *Card* with a *Waterish Blue* (after you have with a small *Pencil*, and the same *Colour* go about the *Purfle* of the Face and *Body*) and then with a reasonable great *Pencil* full of *Colour*, swiftly *Colour* it all over, suffering no part to dry until all be covered, and by this means it will lye even.

If you would have your *Ground Crimson* like *Sattin*, mark out with *Indian Lake*, where, and in what places you would have those strong and hard Lights to fall, which are seen in *Sattin*, and *Velvet*; there lay your Lights with a thin waterish *Lake*, and while it is wet, with a stronger and darker *Colour* of *Lake*, thick *Ground*, lay in the deepnings and strong *Shadows*, close by the Lights; the best way is to take a piece of *Taffety*, &c. and work it by the *Life*.

When the *Ground* is laid, you will find the *Picture* to be strangely changed, the Beauty of the *Grounds* will so dead the *Picture*; therefore lay all your *Lines* over with a flat *White*, and the *Apparel* with fitting *Colours*, only flat without heightning or deepning; then go over the *Face* again, reducing the *Shadow* to as much neatness as you can, Drawing the *Lines* of the *Eye-lids*, expressing the *Red* dark *Nostril*, the *Shadows* entrance into the *Ears*, the deepnes of the *Eye-Brows*, and the most perspicuous Marks of the Face, with a more sharp and curious *Pencil* than before.

Leave not the *Ground* too hard upon the Face with an *Edge*, but with your *Pencil* drive in the *Colours* of the *Ground* into the out-*Line* of the Face, that when the *Work* is done, the *Ground* may seem a great way behind the *Picture*,and the *Face* it self may seem to stand forwards, and off from the *Ground*,raising it by darkning the *Ground* on the light side of the *Picture*, and below on the dark. Then go over the *Hair*, heightning and deepning it, as the *Life* directeth, and gently drawing the *Lines* of those Locks of *Hair* uppermost, and behind over the *Ground*, which else look hard and unpleasant.

If when you have done the second Sitting, and the party gone, or weary with Sitting (as commonly they are) and yet the *Work* is rough (as it is not possible in so small a time, to bring so curious a *Work* to Perfection) in his absence spend some time by your self in Polishing, and working it to Perfection, filling up the empty places, and sweetning the *Shadows* that be hard; which being done, begin with the *Linnen* and *Apparel*, marking out the several *Folds* and *Shadows* that you shall find in the *Life*; heighten the *Linnen* with the purest *White*, and deepen it with *Faint Shadows* made of *Black*, *White*, a little *Yellow*, or else *Blue*. Your *Black must* be deepned with *Ivory Black*, and if in working in the heightning and light Reflexion you mingle with your ordinary *Black* a little *Lake* and *Indico*, or rather a little *Litmus* in stead of *Indico*, you shall find the *Black* to render a rare Reflexion, like to that of well Dyed *Sattin*, especially if your Lights be strong and hard.

CHAP. XI.

The Third Sitting.

THis Sitting will be wholly spent in giving the strong Observations necessary for the rounding the Face; which you will see better to do, the *Apparel*, *Hair*, and *Ground* being already finished. In this Sitting curiously observe whatsoever may conduce to the likeness, as *Scars*, *Moles*, *Glancings* of the *Eyes*, Extending, or Contracting of the *Mouth*, narrowing the *Eyes* in Laughing and the like; to which purpose it will be very necessary that you take occasion by Discourse, to make the Party of a *Jovial Aspect*; and you must be suddain and ready to catch your Observations,and to express them with a bold and quick Hand, remembring not to deepen too fast.

In *Armour* lay liquid *Silver* flat and even,which being dryed, burnish with a *Tooth* fitted in a *Pencil* Stick for that purpose; then Temper the *Shadow* for it of *Silver*, *Indico*, *Litmus*, and a little *Umber*; and *Work* your *Shadows* upon, and over your *Silver*, according to the Life; the heightning is your bright Burnished *Silver*, your deepning the deepest part of the *Shadow*, the thinner part whereof, must be neatly wrought into the *Silver*; and for your *Shadow*, take *English Oaker* Tempered with Liquid *Gold*. There is a Stone growing in an *Oxes Gall*, which being Ground, and Tempered with *Gold*, is excellent for all *Gold Works*; and gives an excellent Lustre and Beauty in your *Shadowing*, which in the deepest and darkest *Shadows*, must be mixed with *Black*, the heightning must be the purest and finest Liquid *Gold*; the manner of working is as followeth.

If in any *Gold Work* there is *Carving* or *Embossing*, and that in your lighter parts it must be Sparkling, you may very finely express it,by raising in those high and round places a little heap of the *Gall Stone*, or *English Oaker*, by often touching with your *Pencil* full of *Colour*, and resting the Point of it in one and the same place, till your Touches be raised above your other *Work*; that done, cover over your raised *Work* with *Gold*, and you shall find it exceeding Fair and Bright.

The like do in *Silver*, to express the roundness, and Lustre of the *Pearl*; the *Ground* must be *White* and *Indico*, the *Shadow Black*, with a little *Pink*.

Diamonds are expressed with flat Liquid *Silver*, thus laid round and high, the deepning *Cherystone Black*, and the deepest *Ivory Black*; the *Silver* dryed and Burnished, is best for the lightning, the stronger and darker your *Shadow* is, the fairer is your *Diamond*.

CHAP. XII.

Of Drawing Beasts, Birds *and* Flowers.

YOU shall find amongst *Beasts* some more difficult than others, and that for two Reasons; first, for a clean making and neat Shape, together with the finest of the *Coat* and *Skin*; secondly,for their Nimblenes, both which for an Example, you may see in a *Horse* whose *Lineaments* are both so curious, and *Coat* so fine, that many *Sinews* and *Veyns* are seen in him.

Note, for the manner of Drawing the *Horse* or any other *Beast*, begin with your *Black Lead*, or *Coal* at the *Fore Head*, drawing downwards the *Nose*, *Mouth*, upper and neither *Chap*, ending your *Line* at the *Throat*; then searching it again where you began from the *Fore-Head*, over the *Head*, *Ears* and *Neck*, continuing it until you have given the full Compass of the *Buttock*, proceeding also to the hinder *Foot*; then begin at the *Throat*, compassing the *Breast*; which done,bring out the *Fore-Feet*; then finish the *Belly* Stroak ending at the hinder *Leg* where you left; which done, draw forth the other hinder *Leg*, and so proceed to the *Tayl*, *Tongue*, *Teeth*, *Eyes*, and lastly to the *Shadows*; and this Method observe in the Drawing of all *Beasts*, and in what Form soever they stand.

Beasts most easy to be drawn,are the *Sheep*,*Cow*, *Hog*, *Camel*, *Dromedary*, *Elephant*, *Fox*, *Wolf*, *Badger*, *Otter*, *Bear*, *Coney*, *Hare*, *Ass*, *Spaniel*, and other rough and thick haired Dogs, with divers others too tedious to Name. The most hard are the *Horse*, *Unicorn*, *Lyon*,*Leopard*, *Tiger*, *Panther*, *Stag*, *Greyhound*, *Ape*, &c.

In Drawing of these and all other *Beasts*, the better you observe their *Action* and *Shape*,the better you may be sure will your *Work* be esteemed; therefore be Experienced in the True and Lively *Shapes*, and to render them in their proper *Colours*.

Of BIRDS.

IN Drawing *Birds*,begin first with the *Head*,and bring from under the *Throat*, the *Breast-Line* down to the *Legs*, where rest; then begin at the *Pinion* to make the *Wing*, which being joyned to the *Back*, is soon finished; the *Eyes*, *Legs* and *Train* must be the last; and be sure you make the farther *Leg* ever shorter, as you do in *Beasts*. For the *Feathers*,take your beginning at the *Head* very small, and so proceed downwards greater and greater; for the true Drawing of *Birds*, you may procure some living ones.

The *Birds* most easily to be Drawn, are all sorts of *Water-Fowl*: the next are those of *Prey*, and the hardest are those that are Tame. The Action of *Birds* is *Flying*, *Pruning* themselves, *Bathing*, *Swiming*, &c.

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FLOWERS, FLIES, &c.

FOr *Flowers*, *Flies*, and ſuch like, I vvill leave to your own Diſcretion, as being not ſo hard, nor of ſo great concernment; yet very delightful to the *Eye*, if vvell performed. For your better aſſiſtance obſerve theſe Directions: Begin it in the middle; then Draw your *Lines* equally divided from thence to the *Line* of the *Compaſs*, which is the hardeſt; and then proceed to the *Shades*, and other Touches, as the *Beards*, *Seeds*, &c. You may make your *Flowers* either open, in the *Bud*, or otherwiſe; and in the ſame manner as you Draw your *Flowers*, ſo Draw your *Leaves*, making only your *Out-ſtroaks* firſt vvith a *Pencil*, or *Coal*, before you give them their Veins and Jaggedneſs.

For *Butter-flies*, *Bees*, *Waſps*, *Graſhoppers*, and the like, ſome are alſo more eaſie to be Drawn than others, and alſo not hard to be Coloured; but for theſe and *Flowers*, I vvould adviſe you in time of Year, to get as many ſeveral ſorts of them as you can, vvhich you may preſerve in *Boxes* (if kept from *Air*) a long time.

But do not keep them too hot, as near the *Fire*, for that vvill dry them too much, and alſo take away the true Colour from them; alſo do not Touch them too much, nor lay one upon another, for that alſo ſpoils them.

CHAP. XIII.

Of LANDSKIPS.

A *Landskip* is the expreſſing the perfect *Viſion* of the *Earth*, and all things placed above the *Horizon*, as *Mountains*, *Hills*, *Valleys*, *Rivers*, *Seas*, *Rocks*, *Groves*, *Woods*, *Foreſts*, *Plains*, *Caſtles*, *Towns*, *Ruines*, &c. in which for the better Adornment, there may be ſeveral ſorts of *Beaſts*, *Fowl*, &c. in all which great Care ought to be taken. I ſhall give you ſome Directions therein.

Take fine *Vellom*, ſtrain it on a thin *Frame*; faſten it with *Starch*, or *Glue*, and work on it without paiſting it on a *Board*. This is the *Italian* manner: You may *Work* it on a *Card* prepared with an *Abortive*, as aforeſaid. Begin with the *Skies*, and if there be any Shinings or Reflexions of the *Sun*, let thoſe be your firſt Work, always obſerving to repreſent a fair *Horizon*.

The yellow and whiteſt *Beams* of the *Sun* muſt be wrought with *Maſticot*, and *White*, and lay by that *Pencil* (except waſh'd clean;) for if any *Maſticot* be mingled with *Blue* for the *Clouds*, or the like, it will make all *greeniſh*, and ſo ſpoil it.

Work the *Bluiſh-Sky* and *Clouds* with *Smalt*, and not *Bice*, which is too *green* a *Blue*: You may likewiſe uſe *Ultramarine*, were it not too Dear.

At your firſt Working, *Dead-colour* all your Piece, and leave nothing uncovered. Let your *Pencil* be ever full of *Colour*; but lay not your *Colours* on too thick and rough. Work your *Sky* down in the *Horizon* fainter and fainter, as you draw nearer the *Earth*; unleſs it be a *Tempeſtuous Sky*. Let your remote *Mountains* appear ſweet and miſty, almoſt indiſtinguiſhable, mixing (as it were) with the *Clouds* aloft in the *Air*. Your next *Ground* muſt be of a *Bluiſh Sea-green*; and as you draw near your firſt *Ground*, let them decline ſometimes into *reddiſh*, and ſometimes into *yellowiſh*.

Your firſt *Ground* muſt be ever of the *Colour* of *Earth*, which is *dark*, *yellowiſh*, *brown*, *green*, &c. eaſier to be diſtinguiſhed by the *Pencil*, than otherwiſe: Of the ſame *Colour* (or near it) muſt be your firſt *Trees*, and ſtill as they are removed in diſtance, they muſt loſe their Colours, Largeneſs, and Perfection.

For the neareſt, darkeſt, and faddeſt *Hills* lay *burnt Umber*; and for the light places, mix ſome *Yellow* with your *Umber*. For the next *Hills* lay *Copper-Green* well thickned on the *Fire*, as aforeſaid. The next *Hills* further off, mingle ſome *yellow Berries* with the *Green*; and let the fourth degree be done with *green Verditer*; and the fartheſt and fainteſt places with *Ultramarine*, *Smalt*, or *Bice*. The *High-Ways* are commonly done with *Red-Lead*, and *White*; but for variety take uſe *yellow Oker*, which muſt be Shadowed with *burnt Umber*: This *Colour* is alſo to be uſed for *Sandy-Rocks*, and *Hills*. The *Rocks* ought to be done with various *Colours*, in ſome places with *Blew* and *White*; in others with *Black* and *White*; in ſome with *Umber* and *White*, and in others with *Red Lead* and *White*, and ſuch other *Colours* as reſemble *Rocks*; but obſerve always to do them with the pleaſanteſt *Colours* you can. The *Bodies* of *Trees* muſt be done with *burnt Umber*, and the *Leaves* with ſuch *Greens* as the *Ground* is. And the whole *Landskip* muſt be *Shadowed* after you have laid on your firſt *Colours*. The darker *Greens* muſt *Shadow* the lighter: *Spaniſh Brown* muſt then Shadow *Red Lead*, and *White*; the *Water* muſt be done with *Black*, *Verditer*, and *White*. Sometimes *Shadowed* with *Copper-Green*; a little *blue Verditer*, when the *Banks* caſt a Green Shade upon the *Water*: At other times it muſt be *ſhadowed* with *Blue Verditer* alone, and where the *Water* is very dark in the *ſhadows* uſe *Indico*, ſome *Blue*, *Verditer*, and *Copper-Green* well thickned.

Let every thing be made to have its true Motion, as when *Trees* are ſhaken with the *Wind*, the ſmall *Boughs* muſt be repreſented as if they ſtruck one againſt the other by their yeilding; In a Word, *Trees* ought to be expreſſed with great Judment, the *Leaves* folding, and falling one over another.

In your *Land-skip* always ſhew a fair *Horizon*. And expreſs the *Heavens* more or leſs, either over-caſt by *Clouds*, or with a *Serene Skie*, ſhewing the *Sun Riſing*, or Setting over ſome *Hill* or *Mountain*. The *Moon* and *Stars* are not to be ſeen, but in Night-pieces.

When you ſhew the Light of the *Sun*, be ſure that all the Light of your *Hills*, *Buildings*, *Trees*, or any *Figure* be given thitherwards. *Shadow* all your *Clouds* from the *Sun*, and take a great care to leſſen your *Bodies* by their diſtance, and not to repreſent them ſo plain as if they were nigh at Hand: As ſuppoſe you were to Draw a *Landskip*, in which ſome part were to be in diſtance 8 or 10 Miles off, in ſuch a caſe do not expreſs any particular Sign, as in *Buildings*, the *Balconies Turrets*, or the like; or in *Figures* the Lively *Colours*, but repreſent them as weakly, and faintly as poſſible, becauſe all theſe particulars through the Greatneſs of their Diſtance are taken away.

The beſt way of making *Land-skips*, is that way which hath been practiſed of late days by our beſt *Work-men*, which is to make them ſhoot, away one part lower than another, and not as many do, in making the *Land-skip* to aſcend higher and higher, nay ſo high, that it doth appear to touch the *Clouds*, as if they had ſtood in a Bottom, when they took the Draught thereof, which is altogether improper, for what Proſpect can be diſcerned at the Bottom of a *Hill*; therefore the beſt and propereſt way, is to make the neareſt *Hill* the higheſt, and ſo the reſt that are farther to ſhoot away under, that the *Land-skip* may appear to be taken from the Top of a *Hill*.

Make all your *Lights* and *ſhadows* to fall one way, both upon the *Ground*, as alſo upon *Trees*, and all things elſe.

Clouds, require to have their Motion, ſometimes violently Condenſated into *Rain*, *Hail*, *Lightning*, and the like; and ſometimes gathered together with the *Winds*.

Note, that all your Motions which are cauſed by the *Wind*, muſt of neceſſity be made to move one way, becauſe the *Wind* doth blow but one way, at once.

The Motions of the *Sea* are to be obſerved, by Repreſenting the divers Movings of the *Waters*, as the Flaſhings of the *Waters* upon *Boats*, *Ships* or the like, and to be Repreſented as it were Floating up and down the *Waters*; You muſt alſo Repreſent the Motions of *Waters*, deſcending from high places.

Be ſure always to place Light againſt Dark, and Dark againſt Light, the meaning is, that the only way to remove the *Ground*, and extend the Proſpect, is by oppoſing *Lights* to *Shadows*, yet ſo as they muſt ever loſe their force and vigour proportional as they remove from the *Eye*; and the ſtronger *Shadows* ever neareſt hand (or as they call it) on the firſt Ground.

If you draw your *Landskip* according to your Invention, it is good to obſerve ſome Directions, *viz.* to ſhew in it the fair ſide of ſome *City*, *Haven*, *Foreſt*, curious *Houſe* with delightful *Gardens*, &c. Alſo *Country Villages*, a *Farm-houſe* with *Barns*, *Stables*, *Water-mills*, *Wind-mills*, &c. Alſo the *Ruins* of *Caſtles*, *Monaſtaries*, *Churches*, or the like. *Pilgrims* travelling through *Wilderneſſes*, *Shepherds* keeping *Sheep*, &c. Theſe and a Thouſand more Inventions are to be obſerved in *Landskips*.

When you colour any *Buildings*, do it with as much variety of pleaſant *Colours*, as is proper to Nature, and not unnatural.

Thus much for Directions to thoſe that can ſpare time for the attaining this noble *Art*: Now to thoſe that are unskilful, or have not ſpare-time to ſpend in the practice of theſe Directions aforeſaid, yet are deſirous to take the Copies of *Prints* or *Pictures* which are not to be obtained, let them follow theſe Directions.

CHAP. XIV.

How to take a true Draught of any Picture.

TAke a Piece of white *Lanthorn Horn*, and lay it upon your *Picture*; then with a hard-nib'd *Pen* made with a *Ravens Quill*, draw the Out-Stroaks of your *Picture* upon the *Horn*; and when it is dry, breath two or three times upon the *Horn*; and preſs it hard upon a Piece of clean *White Paper* a little wet, and the *Picture* that you drew on the *Horn* will ſtick faſt to the *Paper*.

Alſo take a Sheet of *Fine Paper*, and rub it all over on one ſide with *Vermillion*, or *Black Lead*; then lay this ſide of the *Paper* which is coloured, upon another Sheet of *White Paper*; then lay the *Picture* you would Copy, upon the other ſide of the Sheet ſo coloured, and with a *Ravens Quil*, as aforeſaid, draw neatly over all the chief or Maſter-ſtroaks of the *Picture*, and they will all appear on the *Paper*.

Alſo take ſome *Printers Black*, grind it fine, and temper it with *Fair Water*; then take a *Pen*, and dip it therein, and with it draw over all the Maſter-ſtroaks, and Out-lines with the *Muſcles*; then with a *Spunge* wet a clean Sheet of *Paper*, and clap the *Paper* upon it, preſſing it very hard, and the Stroaks will all be on the *Paper*.

CHAP. XV.

To make Paſtils.

YOU need not be over-curious in grinding your *Colours* exceeding fine; but be ſure to mix them well together; and to the *Colours* add a reaſonable quantity of *Plaiſter of Paris* burnt, and finely ſifted; mix them well together thick and ſtiff like moiſt Clay; then take the *Colour* off the *Stone*, and betwixt the Palms of your Hands rub it out as long, or as little as you pleaſe, and dry them in the *Sun* or *Wind*, not by the *Fire*; when they are dry, with a *Pen-Knife* ſcrape them to a fine ſharp Point at one end.

Remember that when you temper faſt and firm *Colours*, as *Umber*, *Oaker*, *Indico*, &c. you uſe the leſs quantity of *Plaiſter of Paris*; but where your *Colours* are looſe, and ſandy, or *Smalt* &c. add the greater quantity.

CHAP.

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CHAP. XVI.

Rules for Painting in Oyl.

HAving already treated of *Drawing*, and *Painting* in *Miniature*, there requires the leſs to be ſaid in *Painting* in *Oyl*, the chief difference being in the mixing them with *Oyl*, and preparing them on the *Pallet* fit to work with; yet you muſt take notice, that ſome *Colours* fit for *Miniature* are improper for *Oyl*: I ſhall not deſcend to the particulars, for you may be ſupplyed either with a whole Sett of *Colours*, or with what you have occaſion for ready made up in *Bladders* and ſold by moſt *Colour-Shops*.

Of theſe *Colours* ſome are to be tempered on the *Pallet* at firſt; ſome muſt be ground, and then tempered; and others muſt be burnt, then ground and tempered. Thoſe tempered on the *Pallet* without grinding in *Oyl*, are *Vermillion*, *Bice*, *Verditer*, *Smalt*, *Ultramarine*, *Lamb-Black*, *Maſticot*, and *Orpment*. Thoſe to be burnt, and then ground and tempered, are *Cerus*, *Ivory*, *Umber*, and *Oaker*; and thoſe that muſt be ground in *Oyl*, and then to be tempered on your *Pallet*, are all the reſt of the *Colours* uſed in *Oyl-Painting*; that is to ſay, *White-Lead*, *Cerus*, *Flake-White*, *Seacoal-Black*, *Charcoal*, *Colens-Earth*, *Lake*, *Kermine*, *Red-Lead*, *Orvetto*, *Verdigreace*, *Terra-Vert*, *Pink*, *Maſticot*, *Smalt*, *Spaniſh Brown*, &c. *Oyl Colours* (if not timely uſed) will have a Skin grow over them; to prevent which, (for thoſe that you will grind your ſelf) put the ſaid *Colours* into *Glaſſes*, with *Fair Water* over them; but for thoſe that you buy ready prepared in *Bladders*, that trouble, as alſo that of burning and grinding, is ſaved.

The *Materials* for *Painting* in *Oyl* are, the *Eaſel*, on which your Piece to work on is ſet; the *Pallet* uſed for putting on the *Colours* for your *Work*, and there tempered and mixed together as occaſion requires, with a thin *Knife*; the *Straining-Frame*, to which is nailed the *Primed Cloth* you are to paint upon; the *Stay* or *Mollſtick*, being a ſmall Stick about a Yard long, which is to reſt your *Arm* upon, when you are at work, being a great ſtay, cauſing a ſteddy Hand; and the *Pencils*, which muſt be of ſeveral Sizes, lengthned with neat Pieces of *Brazil-Wood* for your better commanding and holding them. The ſeveral ſorts of *Pencils* are generally known by theſe names, *Ducks-Quills* fitched and pointed, *Gooſe-Quills* fitched and pointed, *Swans-Quills* fitched and pointed; *Jewelling Pencils*, and *Briſtle Pencils*. As for the *Priming-Cloths* on which you *Paint*, they are cheaper bought, than to be troubled with the preparing them; ſo that I ſhall forbear giving Directions for the ſame.

Upon the *Pallet* let your *Colours* be ſo diſpoſed at convenient diſtances, that there may be room for the mixing of ſome of them together for the making of proper or mixt *Colours*, for the *Face*, *Garments*, and other occaſions, as *Shadows*, &c. and let the *White* be next your *Thumb*, it being moſt uſed; for with it all *Shadows* are to be lightned.

Further Directions in Painting.

HAving all your *Pencils*, which ſhould be two of a ſort, as two *Duck-Quills* fitched, and two pointed; the like of all the reſt: Theſe *Pencils* being thus in a readineſs in your left Hand, with the *Pallet* on your Thumb prepared with *Colours*, proceed to Work, as followeth:

Set the *Frame* and *Cloth* on the *Eaſel* at a convenient height, ſo that ſitting on a *Stool* you may have the *Face* of the *Picture* ſomething higher than your own. Let the *Eaſel* be ſet to the Light, which muſt come in on your left Hand, caſting the Light towards the Right.

Let the *Perſon* you are to Draw, ſit before you at about four or five *Foot* diſtance, and in the Poſture you deſign the *Picture*. Then with a *Crayon*, *Coal*, or the like, draw the Proportion of the *Face* upon the *Cloth*, putting in the *Eyes*, *Noſe*, *Mouth*, *Ears*, *Hair*, &c. Then with your *Swans-Quill Pointed-Pencil*, begin to *Paint* ſome of the lighteſt Parts of the *Face* with the lighteſt *Colour*; as the heightning of the *Noſe*, *Forehead*, and the *Cheek-Bone* of the lighteſt ſide: Then the mean Parts; as the *Chin*, over the upper *Lip*, and the *Cheek-Bone* of the dark Side; and ſo proceed gradually until you come to the reddeſt Part of all.

Lay faint *greeniſh Shadows* in convenient places, and where it is neceſſary to ſoften harſher *Shadows*.

The faint and light Parts being thus done, take a *Gooſe-Quill* pointed, or a *Ducks-Quill* fitched *Pencil*, and begin at the *Eyes* to Shadow with *Lake*, going over the *Noſe*, *Mouth*, Compaſs of the *Ear*, &c. before you lay on any *Colour*, wiping it lightly over with a fine *Rag*, or *Cloth*, to prevent the overcoming of the other *Colours*.

The light and dark *Colours* being thus put in, take a large *Fitch-Pencil*, and ſweeten the *Colours* therewith, by going over the *Shadows* with a clean ſoft *Pencil*; and thus doing will intermix the *Colours* one into another, ſo that they will look ſoft, and as if all laid on together.

At the *ſecond Sitting*, begin again with clean *Pencils* of ſuch bigneſs as your *Work* requires: And at this *Sitting* you muſt obſerve well the Perſon whoſe *Picture* you Draw, taking notice of all the *Features*, and to amend what you find amiſs at your firſt *Sitting*: Then heighten, or deepen the *Shadows*, as you ſee occaſion. And laſtly, Take a *Gooſe-Quill Briſtle*, and put in the *Hair* about the *Face* (if any,) and rub in the greater *Hair* with the greater *Briſtle*, heightning it up with the *Gooſe-Quill Pencil*.

CHAP.

CHAP. XVII.

How to Diſtemper Colours.

TAke about a Quarter of a Pound of *Iſing-glaſs*, and put it into a *Skellet*, with about a Quart of fair *Water*; let it boyl gently until the *Iſing-glaſs* is diſſolved, which done, pour it out of the *Skellet* hot into a dry *Bladder*, for if it be cold it will turn into a *Jelly*; then tye up the *Bladder*, that no *Duſt* get in, and hang it up in ſome convenient place where the *Sun* comes, for about a *Month*, by which time the heat of the *Sun* will rot, or turn it to fair *Water*, which *Water* put into *Glaſſes* for your uſe, for it is better than *Gum-water*; for it heightens the *Colours*, ſets a fair Gloſs upon them, and preſerves them from tarniſhing, and reſembleth *Oyl-Colours* as to the Gloſs. The *Water* is made weaker, if too ſtrong, by putting a little fair *Water* into the *Glaſs*, or as you Work with it; for the thicker the *Jelly* is, the ſtronger will the *Water* be.

CHAP. XVIII.

To Paint in Friſco.

THis way requireth not only a quick and ready *Hand*, but alſo a profound *Judgment*; and that for theſe Reaſons: Firſt, Becauſe the *Painter* muſt begin no more in a Day than he can finiſh; for this kind of *Painting* is to be done upon the *Wall*, or *Ceiling*, whilſt the *Lime* is moiſt and freſh, ſo that what remaineth at that time unfiniſhed will be loſt, by reaſon of the drying of the *Lime*; as alſo the *Wall* will gather a certain hard *Cruſt*, which either with the *Cold*, *Froſt*, or *Heat*, will deſtroy that part which is not finiſhed. And, Secondly, Becauſe the *Colours* ſhew after one faſhion when they are firſt laid on, and the *Wall* remaineth wet, and of another when they are dry. The *Colours* that are uſed in this manner of *Work*, are only ſuch as are made of *Earths*; for ſuch as are made of *Minerals* are obnoxious, and will ſpoil the *Work*.

Now for preparing your *Colours*, they are to be Ground, as formerly hath been ſhewed, with fair *Water*, and are to be tempered with the ſame; for if tempered with *Size*, or *Gum*, the *Wall* will not continue its clearneſs; and beſides, the *Colours* in a ſhort time will decay, and turn Black.

If you mix your *Colours* with the *Whites* of *Eggs* beaten to an *Oyl*, it is very good to preſerve them.

Let your *Pencils* be long, and ſoft, that your *Work* may be ſmooth: And let your *Pencils* and *Bruſhes* be full of *Colour*, to flow freely from them.

CHAP. XIX.

Rules for the diſpoſing or placing of Pictures, *and* Paintings.

LEt the beſt Pieces be ſo placed as to be ſeen with a ſingle Light, by which means the *ſhadow* falls naturally, and the more under the Light the better.

Let the *Porch* or Entrance into the *Houſe*, be adorned with *Ruſtick Figures*, and things *Rural*. In the *Hall Shep-herds*, *Peaſants*, *Cattle*, *Sheep* and the like.

The *Stair-caſe*, ought to be ſet out with Pieces of *Buildings*, *Land-skips*, *Hiſtory*, &c. the like in the *Dining*, and *Withdrawing Rooms*, but with thoſe of better *Painting*.

For the *Galleries*, let there be good *Hiſtories*. In *Banquetting* and *Summer Houſes*, put thoſe Pieces that ſeem chearful and merry; with good *Land-skips*.

In your *Bed Chambers*, place your own, with your *Wives*, *Children* and *Relations*.

If your *Pictures* hang high, let them incline ſomething forward at the Top, otherwiſe the Viſual Beams of the *Eye*, extending to the Top of the *Picture*, appear further off than thoſe at the Foot.

For the cleanſing Old, or Foul Pictures.

TAke good *Wood Aſhes* finely ſearced; or elſe *Smalt*, or *Powder Blue*, and with a *Spung* and fair *Water* gently waſh over the *Picture*, (taking great care of the *ſhadows*) then dry it very well with a clean *Cloth*; which done, *Verniſh* it over with ſome good *Verniſh*; but ſuch as may waſh off, if occaſion requires.

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HERALDRY.

ARMS according to their Original use are Tokens, or Resemblances signifying some Act or Quality of the *Bearer*, either Military or Civil, and of sundry Forms of Bearing, for the adorning their *Shields*, *Banners*, *Coaches*, *Houses* and the like. And there is (as it were) a kind of *Sympathy* between the *Arms* and their *Bearers*, insomuch that he that Dishonourably useth the *Arms* of any Man, seemeth to offer an Affront to the person of the *Bearer*.

The Skill of *Armory* consists in *Blazoning* and *Marshalling*. By *Marshalling* is understood the joyning of divers *Arms* in one *Shield*: By *Blazoning* is meant the *Displaying*; or expressing a *Coat* of *Arms* in its proper *Colours*, and *Metals*; for to lay *Colour* upon *Colour*, and *Metal* upon *Metal*, is a great fault, and a different Form of *Blazon* makes the *Arms* not the same; And you must avoid Repetition of words, a Concise way being the best.

In *Blazoning*, first begin with the *Field*, and then proceed to the *Charge*; and if there be sundry things charged in the *Field*, whether of one, or of divers kinds, you must name that first which is most Predominate.

The *Blazon* of *Arms* consists in their *Accidents* and *Parts*, and such Accidents are *Tincture* and *Differences*.

Tincture (as *Guillim* noteth) is a variable Hew of *Arms*, and is as well common to Differences of *Arms*, as to *Arms* themselves, and the same is Distributed into *Colours*, and *Furs*.

Colour is an External Dye, wherewith any thing is Coloured, or Stained; or else is the Gloss of any Body beautified with Light; and *Colour* here mentioned, is both General and Special; by General, is understood the Proper and Natural *Colour* of each particular thing, whether Natural or Artificial, of what kind soever they are, Illustrated in their External and proper Beauty.

Things Born in their Natural *Colours*, are to be *Blazoned* proper, and not to mention the *Colour*.

Other things there are in *Armory*, that have only Name attributed to them, and no *Colour* Specified in the *Blazon* thereof, the Name being sufficient to express the same, although the Form is all one and the same; and that is, the Resemblance of a *Ball* or *Bullet*, the Names of which, as also the *Colours* Appropriated unto them are as followeth. 1, *Besants* whose *Colour* is *Or*. 2, *Plates* are Argent. 3, *Hearts* are Azure. 4, *Pellets* or *Ogresses* are Sable. 5, *Torteauxes* are Gules. 6, *Pomeis* are Vert. 7, *Gosses* are Purpure. 8, *Orenges* are Tenne, and 9 *Guzes* are Sanguine; and in these 9 are all the *Colours* usually made use of in *Blazonry*.

Arms are *Blazoned* by *Metals* and *Colour*, by *Precious Stones*, and by *Planets*. By *Metals* and *Colours* when belonging to *Gentlemen*, under the Degree of *Nobiles Minores*, as *Baronets*, *Knights*, *Esquires*, and *Gentlemen*; By *Precious Stones*, when to those of *Nobiles Majores*, as *Dukes*, *Marquesses*, *Earls*, *Viscounts* and *Barons*; and by *Planets* when to *Emperors*, *Kings*, and *Soveraign Princes*.

Metals and Colours.	Precious Stones.	Planets.
Or.	*Topaz.*	*Sol.*
Argent.	*Pearl.*	*Luna.*
Gules.	*Ruby.*	*Mars.*
Azure.	*Saphir.*	*Jupiter.*
Sable.	*Diamond.*	*Saturn.*
Vert.	*Emerald.*	*Venus.*
Purpure.	*Amethist.*	*Mercury.*
Tenne.	*Jacynthe.*	*Dragons Head.*
Sanguin.	*Sardonix*	*Dragons Tail.*

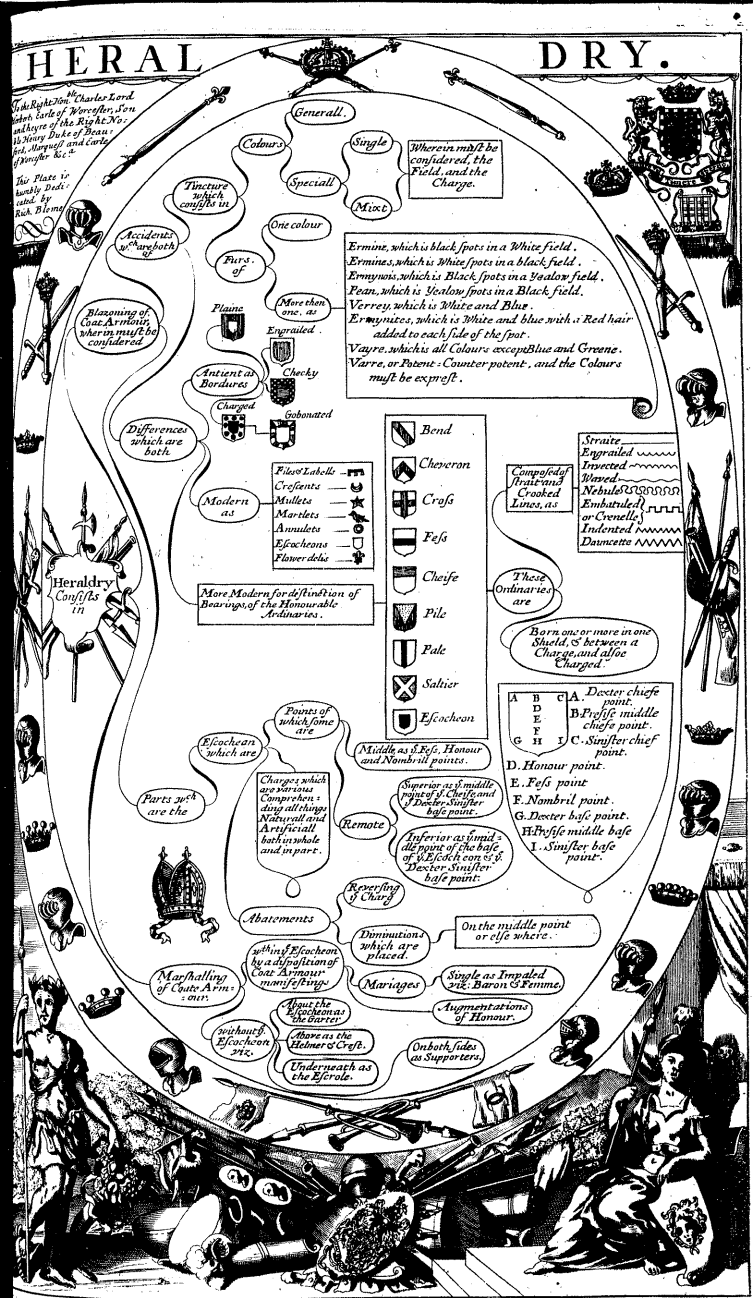
These *Colours* are distinguished from each other, by several *Hatches* or *Marks* in Graving, as are Represented in the Plate of *Arms*, for Examples of *Bearings* Number 1 signifying *Or*, Number 2 *Argent*, 3 *Gules*, 4 *Azure*, 5 *Sable*, 6 *Vert*, and for the three last *Purpure*, *Tenne*, and *Sanguin* being seldom used, are expresst by Stroaks overthwart the *Shield*, as in Number 7.

From *Metals* and *Colours*, I shall proceed to *Furs*, used as well in *Doublings* of the *Mantles* appertaining to *Coat-Armour*, as in the *Coat-Armour* themselves.

Furs consist of one *Colour* alone, or of more than one.

Furs that are Compounded of two *Colours* only, are sorted either
- with *Black*, and are either
  - *Black* mixt with *White*, as *Ermine*. Or *Black* mixt with *Tellow*, as *Ermenois*. Or *Vairy*, *Argent* and *Azure*, *Black*, such are according to *Leigh*
  - *Ermines*. and *Erminois*. and *Pean*. and the like *Colour*.
- without *Vairy*, *Or* and *Gules*, or

For your better Explanation, *Ermine* is when the *Field* is *Argent*, and the *Powdring* is *Sable*, as Number 8. *Ermines*, when the *Field* is *Sable* and the *Powdring* is *Argent*, as Number 9. *Ermenois* when the *Field* is *Or*, and the *Powdring Sable*, as Number 10, and *Pean* is when the *Field* is *Sable*,


HERALDRY.
To the Right Hon.ble Charles Lord Somerset, Earle of Worcester, Son, and heyre of the Right Noble Henry Duke of Beaufort, Marquesse and Earle of Chepstow &c.
This Plate is humbly Dedicated by Rich. Blome
Heraldry Consists in
Colours
Generall
Speciall
Single
Mixt
Wherein must be considered, the Field, and the Charge.
Tincture which consists in
One colour
Ermine, which is black spots in a White field.
Ermines, which is White spots in a black field.
Ermynois, which is Black spots in a Yealow field.
Pean, which is Yealow spots in a Black field.
Verrey, which is White and Blue.
Ermynites, which is White and blue with a Red hair added to each side of the spot.
Vayre, which is all Colours except Blue and Greene.
Varre, or Potent-Counter-potent, and the Colours must be expresst.
Accidents wch are both of
Furs of
Plaine
More than one, as
Engrailed
Checky
Gobonated
Antient as Bordures
Charged
Blazoning of Coat Armour, wherein must be considered
Differences which are both
Modern as
Fillet Labells
Crescents
Mullets
Martlets
Annulets
Escocheons
Flower delis
More Modern for destinction of Bearings, of the Honourable Ordinaries.
Bend
Chevron
Crosse
Fesse
Cheife
Pile
Pale
Saltier
Escocheon
These Ordinaries are
Composed of Right and Crooked Lines, as
Straite
Engrailed
Invected
Waved
Nebule
Embatteled or Crenelle
Indented
Dauncette
Born one or more in one Shield, & between a Charge, and also Charged.
A B C D E F G H I
A. Dexter chiefe point.
B. Professe middle chiefe point.
C. Sinister chief point.
D. Honour point.
E. Fess point
F. Nombril point.
G. Dexter base point.
H. Professe middle base point.
I. Sinister base point.
Points of which some are
Escocheon which are
Middle as S. Fess, Honour and Nombril points.
Parts wch are the
Charges which are various Comprehending all things Naturall and Artificiall both in whole and in part.
Remote
Superior as S. middle point of S. Chiefe and S. Dexter Sinister base point.
Inferior as S. middle point of the base of S. Escocheon & S. Dexter Sinister base point.
Reversing & Charg
Abatements
Diminutions which are placed.
On the middle point or else where.
Marshalling of Coate Armour
within Escocheon by a disposition of Coat Armour manifesting
Mariages
Single as Impaled wch Baron & Femme.
Augmentations of Honour.
About the Escocheon as the Bartey.
Above as the Helmet & Creste.
Underneath as the Escrole.
On both sides as Supporters.
without Escocheon wch

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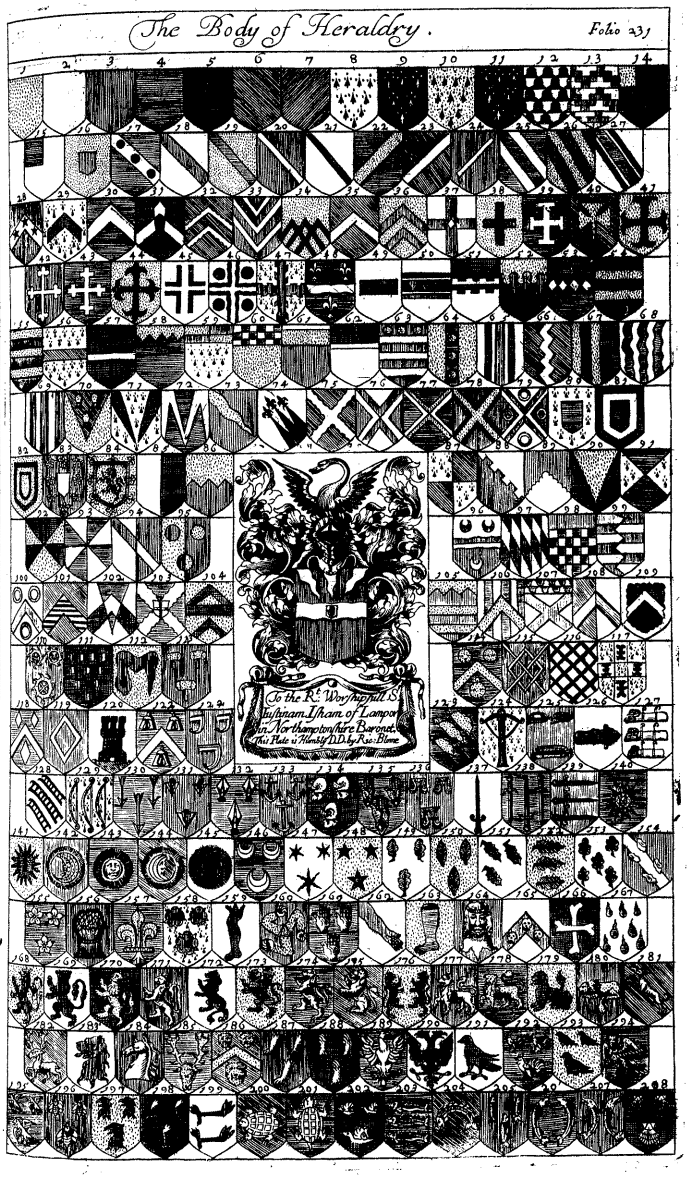

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Sable, and the *Powdring Or*, as Number 11. *Vaire* is represented by Number 12; and for *Vairy Copy*, or *Potent-Counter-Potent*, which is another sort of *Fur* where the *Colours* must be expreſt in the *Blazoning*, as in Number 13.

BORDURS.

BORDURS were firſt deviſed for diſtinction of *Coat-Armour* of particular Perſons of one and the ſame Family each from other amongſt themſelves; and of theſe there are ſeveral ſorts, as born *Plain*, *Engrailed*, *Invected*, *Indented*, *Checky*, *Gobonated*, *Vaire*, *Counter-Company*; and alſo *Charged*; Examples of ſome of which are taken notice of in the *Table*, which may ſerve as Examples for any other.

More *Modern Differences*, and now uſed in *Coat-Armour*, are *Labels*, *Creſcents*, *Mullets*, *Martlets*, *Annulets*, and *Flower-de-Lis*. Examples of which are ſet down in the *Table*, under the Head of *Modern Differences*, by which every Houſe ought to be diſtinguiſhed from the Elder; the ſecond Brother, or Houſe, bearing the *Creſcent*, the third the *Mullet*, the fourth the *Martlet*, the fifth the *Annulet*, and the ſixth the *Flower-de-Lis*. The *Label* being the diſtinction of the Elder Brother, during the Life of his Father. But as to *Daughters*, they bear their *Fathers Coat Armour* without any diſtinction.

Parts of Arms.

THE *Parts* of *Arms* are the *Eſcocheon*, and the *Ornaments* without it.

The *Accidents* in the *Eſcocheon* are *Points* and *Abatements*. *Points* are certain places in the *Eſcocheon* diverſly named, according to their ſeveral Poſition, whereof ſome are in the *Middle*, and ſome *Remote*; thoſe in the *Middle*, are in, or near the *Center* of the *Eſcocheon*, and ſuch are the *Honour*, the *Feſs*, and the *Nombril Points*.

The *Feſs Point* is in the exact *Center* of the *Eſcocheon*; the *Honour Point* is next above the ſame in a direct *Line*; and the *Nombril Point* is next underneath the *Feſs Point*.

Remote Points are thoſe placed at a further diſtance from the *Center* of the *Eſcocheon*; and of theſe ſome are *Superiour*, and ſome *Inferiour*. The *Superiour* are thoſe that have their being in the Upper part of the *Eſcocheon*, and of theſe there are *Middle*, and *Extreams*; the *Middle* is the preciſe *Middle* of the *Chief* between the two *Extreams*: The two *Superiour Extream Points* do poſſeſs the *Corners* of the chief part of the *Eſcocheon*, and are called *Dexter*, and *Sinifter*.

The *Inferiour Points* do poſſeſs the *Baſe* of the *Eſcocheon*; and of theſe there are alſo both *Middle*, and *Remote*. For the Explanation of all which there is an *Eſcocheon* in the *Table* with *Letters* ſhewing the ſame. And the knowledge of theſe *Points* are of great uſe and concernment, and ought to be well obſerved.

ABATEMENTS.

AN *ABATEMENT* is an Accidental Mark annexed to *Coat-Armour*, ſhewing ſome diſhonourable Quality in the *Bearer*, whereby the Dignity of the *Coat* is abated.

They conſiſt of *Diminution*, and *Reverſing*.

Diminution is the blemiſhing of ſome particular Point of the *Eſcocheon* by ſome *Staynard Colour*, as *Tenne*, *Sanguine*, or *Purpure*; or by reverſing the *Charge* in the *Coat*. But not knowing any that bear any *Abatements* in their *Arms*, it will be to little purpoſe to tell what they are.

REWARDS of HONOUR.

THere are ſeveral Forms of *Charges*, on which *Rewards* and *Additions* of *Honour* are oftentimes placed in *Coats*, as *Cantons*, *Quarters*, *Eſcocheons*, *Girons*, *Flaſques*, and *Voiders*; but thoſe in moſt uſe are the three firſt, according to Number 14, 15, 16, as *Sable* a *Canton Or*; *Argent*, a *Quarter Azure*; and *Or*, an *Eſcocheon Gules*.

ESCOCHEONS, and the HONOURABLE ORDINARIES.

ESCOCHEONS are either of one *Tinſture*, or more than one: Thoſe of more than one, ſome are more predominate; and that is ſaid to predominate, when ſome one *Metal*, *Colour*, or *Fur* is ſpread, or underſtood to be ſpread all over the Surface of the *Eſcocheon*, which is termed the *Field*, or *Shield*. And in ſuch *Eſcocheons* as have in them more *Tinctures* than one (as moſt have) the *Field* and *Charge* muſt be obſerved: And in your *Blazoning* firſt name the *Field*, and then proceed to the *Charge* thereon; and if there be ſeveral *Charges*, then name that firſt which is moſt predominate, and neareſt the *Field*.

The *Charge* is that which poſſeſſeth the *Field*, whether it be *Senſitive*, or *Vegetable*; *Natural*, or *Artificial*; and is placed either throughout all the *Superficies* of the *Eſcocheon*, or elſe in ſome ſpecial part of the ſame.

The common *Accidents* of *Charges* are *Adumbration*, or *Tranſparency*; or they are *Tranſmutation*, or *Counter-changing*.

All *Charges* of *Arms* are either Proper, or Common, and in theſe the making and manner of *Bearing* muſt be conſidered.

The making of the *Ordinaries* conſiſts of *Lines* diverſly compoſed, which is the Matter whereof they are formed, and according to the divers tracts and forms of *Lines*, they receive their Shape and variation of Names; and the property of theſe *Lines* are their *Rightneſs*, or *Crookedneſs*, which are ſet down in the *Table*, being *Strait*, *Engrailed*, *Invected*, *Waved*, *Nebule*, *Embatuled*, or *Crenelle*, *Indented*, and *Dauncette*.

The *Honourable Ordinaries* are the *Bend*, *Cheveron*, *Croſs*, *Feſs*, *Chief*, *Pale*, *Pike*, *Saltier*, and *Eſco-*

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Escocheon; and were moderniy invented for the Distinction of *Coat-Armour*; you will find their Forms or Shapes set down in the *Plate* of *Arms*.

These *Ordinaries* are Born sometimes of themselves, in plain *Fields*, sometimes between a *Charge*, sometimes *Charged*, sometimes two or more of them joyned together in one *Shield* with a *Charge*, and sometimes *Counter-changed*; Examples of all which are at large set down in a Volum of *Heraldry*, published by me.

The *BEND* doth contain the Fifth part of the *Field*, in breadth, if Uncharged, but if Charged then the third. It is said to Represent a *Ladder*, set Slope to Scale the *Walls* of a *City*. This *Ordinary* is divided into a *Bendlet*, which is limited to the Sixth part of the *Shield*; Into a *Garter*, which is the *Moity* of a *Bend*; into a *Coft* which is the Fourth part of a *Bend*, and into a *Ribon* which is the *Moity* of a *Coft*. In the *Plate* of *Arms*, Number 17 Represents a *Bend*, which is Charged with *Pellets*: Number 18 a *Bendlet*; Number 19 a *Garter*; Number 20 a *Coft*; and Number 21 a *Ribon*.

There is also a *Bend Sinister* which goeth thwart the *Escocheon* from the *Sinister Chief* to the *Dexter Base*, which is quite contrary to the other *Bend*; And this *Bend* is subdivided into a *Scrape* which is the *Moity* of the *Bend*, and into a *Batune* which is the Fourth part of the *Bend*, and this is the usual Badge of Illegitimacy. The *Escocheon*, Number 22 sheweth the *Bend Sinister*; Number 23 the *Scrape*, and Number 24 the *Batune*, which must not extend to the extream Points of the *Escocheon*, but only to be as a *Bar* over the *Charge*.

Two *Bends* are also Born; Also *Bendy* of 6, or 8; and a *Bend* between two *Cottizes*, according to the Examples, Number 25, 26, and 27.

The *CHEVERON* Represents the *Rafters* of a House, and was antiently the Head-Attire of *Women Priests*. It takes up the *5th* part of the *Shield*, and is subdivided into the *Cheveronel* which is half the *Cheveron*; and into a *Couple-close*, which is the Moity of the *Cheveronel*; and this is not Born, but by Pairs, except there be a *Cheveron* between them.

The *Cheveron* is sundry ways used in *Bearings*, as well as the *Bend*, and other of the *Honourable Ordinaries*; Examples of which are in the *Table* of *Arms*, which are thus *Blazoned*, Number 28 *Gules*, on a *Cheveron*, *Argent*, three *Mullets Sable*. 29 *Ermin*, a *Cheveron Couped Sable*. 30 *Azure*, a *Cheveron* in *Chief Argent*. 31 *Sable*, a *Cheveron Rompe Argent*. 32 *Vert*, a *Cheveron Engrailed* voyded *Argent*. 33 *Gules*, three *Cheveronels*, reversed *Argent*. 34 Or, three *Cheveronels*, braced in the Base of the *Escocheon Sable*. 35 *Vert*, a *Cheveronel Argent*. 36 Or, two *Cheverons Gules*, and commonly 3 *Cheverons*, are born in one Shield, and composed of strait, or crooked *Lines*.

The *CROSS* taketh up the *5th* Part of the *Escocheon*, but if charged then the third: There are divers sorts of *Crosses*, but those most usally Born amongst us are set down in the *Plate* of *Arms*; and are thus Blazoned, Number 37 *Argent*, a *Cross Pierced Gules*. 38 Or, a *Cross Couped Sable*. 39 *Azure*, a *Cross Potence Argent*. 40 *Vert*, a *Cross Pattee Fitchee* Or. 41 Or, a *Cross Molin Sable*. 42 *Gules*, a *Cross Botony Argent*. 43 *Azure*, a *Cross Croslet Argent*. *Cross Croslets* are Born more than one in a *Shield*, and likwise as well on, as between any of the *Ordinaries*. 44 Or, a *Cross Flory Sable*. 45 *Argent*, a *Cross Voyded Sable*. 46 *Argent*, *Cross Wavey Voyded Sable* between 4 *Torteauxes*. 47 *Ermin*, a *Cross Ragule Gules*.

Note, that any of the *Crosses* may be Born *Fitchee*, as also *Pierced*, or *Quarter Pierced*, also between, or upon any of the *Ordinaries*.

The *FESS* containeth the Third part of the *Escocheon* in breadth, and doth Occupy the *Center* of the *Shield*. This hath formerly been taken for the *Belt*, or *Girdle* of Honour, as dividing the *Shield* into two equal Parts.

The *BAR* differeth not from the *Fess*, but only that it contains the Fifth part of the *Shield*, whereas the *Fess* doth posses but the Third. It is divided into the *Closet*, which contains the *Moity* of the *Bar*, and into the *Barulet*, which is half the *Closet*. The *Bar* is generally Born two in one *Shield*.

The Examples of the *Fess* and *Bar* in the *Plate* of *Arms*, are Number 48 *Azure*, a *Fess Wavey* between 3 *Flower-de-Lis Argent*. 49 *Argent*, a *Fess Humid Sable*. 50 *Argent*, a *Fess Per Fess*, indented *Gules* and *Sable*, between two *Cottizes Counterchanged*. 51 *Per Fess Sable*, and *Argent* a *Fess Batile*, *Counter-Batled Counter-changed*. 52 *Per Fess Or*, and *Sable*, a *Fess Nebule Gules*. 53 *Azure* 4 *Fusils* in *Fess Argent*. 54 *Gules*, two *Bars Or*. 55 *Barry* of six Or and *Gules*. 56 *Ermin* a *Closet Vert*. 57 *Sable* a *Barulet Argent*.

The *CHIEF* doth contain the Third part of the *Escocheon* in depth. It is divided into the *Fillet*, which contains the Fourth part of the *Chief*, and standeth in the *Chief Point*. This *Ordinary* is also subject to a *Charge*, and is Born with strait and crooked *Lines*. The Examples of which are Number 58 *Azure*, a *Chief Indented Or*. 59 *Ermine*, a *Chief* quarterly. Or, and *Gules*. 60, Or, a *Chief Checky Argent*, and *Azure*. 61 *Gules* a *Chief Argent* surmounted by another, Or. 62 *Argent*, a *Chief Sable* in the nether part a *Fillet Argent*. 63 *Azure* three *Bars Argent*, in *Chief* as many *Bezants*.

The *PALE* contains the third part of the *Field*; It is subdivided into the *Pallet*, which is the *Moity* of the *Pale*, and is never to be charged with any thing, neither must it be parted; and into an *Endorse*, which is the Fourth part of the *Pale*, and is not used but when the *Pale* is between two of them. If the *Pale* be upon any *Beast*, that is the *Beast* as it were behind it, then the Term of *Blazoning* it is, he is *Debrused* with the *Pale*; but if the *Beast* be on the *Pale* then he is supported by the *Pale*. The Examples for *Pales* in the *Plate* of *Arms* are Number 64 Or, on a *Pale Azure* 3 *Bezants*. 65 *Argent* a *Pale Gules*, between two *Endorses Sable*. 66 *Vert*, a *Pallet Argent*. 67 *Party Per Pale Argent* and *Sable*, a *Pale Counter-changed*. 68 *Argent*, 3 *Pallets Wavy Azure*. 69 *Paly* of six *Argent* and *Gules*.

The

The *PILE*, consists of twofold *Lines*, formed like a *Wedge*, and was a *War-like Weapon*, used amongst the *Romans*. It is by some not allowed to be one of the *Ordinaries*. It is Born several ways, and more than one in a *Shield*, according to the Examples, Number 70 Or, on a *Pile Vert*, 3 *Garbs* or *Wheat Sheaves* of the *Field*. 71 *Ermin*, two *Piles Sable*. 72 *Argent*, 3 *Piles*, one issuing out of the *Chief*, between two others reversed *Azure*. 73 *Gules*, a *Pile waved* issuing out of the *Dexter Corner Bendways* Or. 74 *Argent*, a *Triple Pile-flory* on the *Tops*, issuing out of the *Sinister Base* in a *Bend Sable*.

The *SALTIER* contains the fifth part of the *Shield*; but if charged, then the third. This is said to be about the height of a *Man*, and was used to *Scale* the *Walls* of a *Town*, being driven full of *Pins*, which served for *Steps*.

It is born with strait, or crooked *Lines*, with a *Charge*, or *Charged*, *Counter-changed*, one *Saltier* surmounted by another; parted *per Saltier*, a *Saltier Counterchanged*, and *Quarterly quartered*, &c. according to the Examples in the Plate of *Arms*, Number 75, *Vert*, a *Saltier Engrailed Argent*. 76 parted *per Saltier Argent* and *Gules*, a *Saltier Counterchanged*. 77, *Azure*, a *Saltier Quarterly quartered*, Or and *Argent*. 78, *Gules*, on a *Salier* Or, another *Sable*. 79, *Gyrony* of four *Argent* and *Gules*, a *Saltier* between four *Mullets Counterchanged*.

An *ESCOCHEON* contains the fifth part of the *Shield*, and must be placed in the *Fess-Point*. This is also termed an *Escocheon* of *Pretence*, and is so Born by those that Match with an *Heiress*, giving therein her *Coat* of *Arms*.

About an *Escocheon* is usually an *Orle* of something, as *Martlets*, *Cinquefoils*, or the like, as in the Example 83. Sometimes it is born as an *Orle* it self, as Example 81. Sometimes an *Orle* of two *Pieces*, that is, one within another, as Example 82. Sometimes three plain *Escocheons* without any *Charge* in them. Sometimes double, or single *Treasures* (a *Charge* much used in *Scotch Coats*) as Example 84.

PARTITIONS.

Partitions are such in which there is no *Tincture*, that is, *Metal*, *Colour* or *Fur* predominating in them, and are formed of sundry forts of Lines of Partition, occasioning oft times *Counter-changing*, and *Transmutation*, and these kind of *Bearings* are subject to be born *Engrailed*, *Indented*, *Wavey*, *Invected*, *Embattuled*, *Nebule* or the like; *Examples* of which are in the Plate of *Arms*, viz. 85 *per Pale Argent* and *Sable*. 86 *per Fess indented* Or and *Gules*. 87 *Quarterly Ermine* and *Vert*. 88 *per Bend Embattuled Argent* and *Gules*. 89 *per Cheveron Engrailed Gules* and *Argent*. 90 *per Pile*, Or and *Sable*. 91 *per Saltier*, *Gules* and *Ermine*. If the *Field* is divided into 6, 8, or more *Pieces*, then it is *Blazoned* Gyrony of 6, 8 or more *Pieces*, and name the *Colours*, as *Example* 92 *Gyrony* of 6 *Pieces*, Or and *Azure*. 93 *Gyrony* of 8 *Pieces Azure* and *Argent*.

COUNTERCHANGES.

Counterchanges are commonly Born where the Field hath a *Charge*, which is always *Counterchanged* according to the *Examples*. 94 *per Pale*, *Argent* and *Gules*, a *Bend Counterchanged*. 95 *per Pale*, Or and *Gules* 3 *Rundles* Counterchanged. 96 *per Fess*, *Argent* and *Gules* a *Bar* between 3 *Crescents Counterchanged*. 97 *Paly Bendy*, *Argent* and *Sable*. 98 *Checky*, *Argent* and *Azure*, a *Chief Gules*. 99 *Barry* of 6 parted *per Pale indented*, *Argent* and *Gules Counterchanged*.

There are Sundry Bearings of 2 or 3 *Ordinaries* in one *Shield*, as on a *Cheveron* 3 *Bars Gemele*. A *Pile* Surmounted on a *Cheveron* on a *Saltier Engrailed* an *Escocheon* charged with a *Cross*. A *Fess* between 2 *Cheverons*. Two *Bars* and a *Chief* indented. *Paly* of 6, a *Cheveron*, A *Saltier*, and *Chief* vary. *Per Pale* a *Cheveron Counterchanged*. A *Cheveron* within a *Border* engrailed. A *Cross*, and *Chief*, &c. *Examples* of which are in the *Plate* of *Arms*, from Number 100 to 109.

For the better *Methodizing* a Body of *Heraldry*, all sort of Bearings may be comprehended under these Heads, viz. *Civil Artificial things*, *Military things*, *Celestials*, *Vegetables*, the *Parts* of *Mans Body*; *Animals*, as *Beasts* and *Insects*, *Fowl* and *Fish*.

CIVIL ARTIFICIAL THINGS are such that are made by Man, and for his use; which may be reduced under several Heads, as they relate to the use of Civil *Life*, as the *Ensigns* of Dignity, both *Temporal* and *Ecclesiastical*; or of *Professions* both *Liberal*, *Mathematical*, and *Mechanical*, as they relate to *Military Actions*; as well for *Land* as *Sea*: And such are *Scepters*, *Crowns*, *Mounds*, *Caps* of *Maintenances*, *Mantle* of *Estate*, *Maces*, *Garters*, *Tassels*, *Sword* of *Estate*, *Crosiers*, *Annulets*, *Billets*, *Wh* *Mauncles*, *Purses*. *Rural Instruments*, as *Harrows*, *Scithes*, &c. *Barrels* or *Tuns*, *ters Tools*, as *Squares*, *Mullets*, &c. *Bells*, *Fish*, *Wheels*, and *Nets*, *Cards*, *Dice*, *Tab* *Cups*, *Lozanges*, *Fusils*, *Muscles* and *Torte* *es*, with divers other *Artificial things* used in *Armory*, too Tedious to Name.

MILITARY THINGS are such that are as well for Offence as Defence, as *Halberts*, *Spears*, *Swords*, *Daggers*, *Cross-Bows Launces*, *Bows*, *Arrows*, *Darts*, *Pheons*, *Clarions*, *Battering Rams*, *Shakbolts*; *Scaling-Ladders*, *Beacons*, *Murthering Chainshot*, *Trumpets*, *Drums*, *Tents*, *Castles*; *Towers*, *Arches*, *Helmets*, *Morions*, *Saddles*, *Horsefshoes*, *Gantlets*, *Armour*, *Waterbouzets*, *Horses*, *Chaplets*; *Anchors*, *Sails*, *Masts*, *Ships*, *Gallies*, *Ruthers*, &c.

CELESTIALS are of sundry sorts, some are Natural and meerly formal, as *Angels* and *Spirits*, and others both Formal and Material, as the *Sun*, *Moon* and *Stars*, as also such Natures as are *Sublunar*, as all kind of *Minerals*; which have Life after a sort, as *Angels*, *Cherubs*, the *Sun*, *Moon*, *Stars*, *Blazon Stars*, *Meteors*, and *Comets*, *Flames* of *Fire*, *Crescents*, *Mullets*, *Clouds* and *Rays* of the *Sun*, *Jupiters-Thunderbolt*, *Rainbows*, &c.

Note, that *Stars* are born of several *Rays*, as 6, 8, 14 and the like, also the *Sun* is born *Eclipsed*, likewise the *Moon Eclipsed*, as also in her *Increscent* and *Decrescent*. *Mullets* are also born of 6 or 8 *Points*; but generally of 5, and then

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you need not expreſs the Number of *Points*; likewiſe *Mullets* are Born piereed.

VEGETABLES do comprehend *Trees*, *Fruits*, *Flowers*, *Plants*, and *Leaves*; as *Trees* growing with *Fruit*, *Stems* of *Trees* Radicated, *Limbs* of *Trees* Ragaled, *Stocks* or *Stumps* of *Trees*, *Leaves* of ſundry ſorts of *Trees*; and that born diverſly, as *Slipped*, *Pendant*, *Bendways*, *Barways*, *Saltier Wiſe*, &c. *Trefoyls*, *Quaterfoils*, *Cinquefoils*, which are alſo Slipped; *Roſes*, *Flower-de-Lis*, with other *Flowers*, *Fruits*, as *Pears*, *Plums*, *Pomgranets*, *Grapes*, *Sheaves* of *Corn*, *Wheat-Ears* and *Stalks*, &c.

The ſeveral parts of *Mans Body*, as *Heads Couped* and *Erazed* at the *Shoulders*, as well *Sarazens*, *Blackamores*, as others: Alſo *Arms*, *Legs*, and *Handi*, *Dexter* and *Sinifter*, both *Couped* and *Erazed*; likewiſe three *Arms* or *Legs* conjoyned and flexed in Triangle in the *Feſs Point*. *Hearts* which are ſometimes born wounded and Stuck with *Darts*; *Deaths-Heads*, *Shin Bones*; *Drops*, as *Gutte-de Sang*, *Gutte de-Eau*, *Gutte-de Poix*, *Gutte-de Carmes*, &c.

ANIMALS are Born both whole, and that in ſeveral Poſtures, as alſo in parts. Thoſe of Prey, as *Lyons*, *Tigers*, *Bears*, *Wolves*, &c. are in moſt eſteem, and whole *Animals* more than parts thereof.

All *Quadrupèd Beaſts* are eſteemed more worthy of Bearing, than *Fowl* or *Fiſh*, in regard they contain in them more worthy and commendable Significations of Nobility, and the *Males* are always eſteemed the more worthy than the *Females*; but it is otherwiſe with *Fowl* of Prey, the *Female Hawks* being the beſt. And all *Savage Beaſts* muſt be Armed.

The *Lion* being the nobleſt *Beaſt*, I ſhall chiefly make uſe of him for expreſſing the *Blazon* of moſt *Beaſts*, as to the ſeveral *Poſtures*. They are born *Rampant*, *Rampant Gardant*, *Regardant*, and *Courant*; ſometimes with two *Heads*, and ſometimes with two *Tails*; They are alſo born two together, as *Rampant Combatant*, that is, *Faces* together, and *Rampant Endorſed*, that is, *Back* to *Back*. They are alſo born *Paſſant*, *Paſſant-Gardant*, and *Regardant*; alſo *Seiant*, *Couchant*, and *Dormant*. But inſtead of uſing the Term *Rampant* to a *Beck*, or *Unicorn*, ſay *Springing*: and to a *Fox*, *Saliant*. *Dogs* are generally Born *Currant* or *Paſſant*.

As to the Parts of *Beaſts*, whether *Lions*, or other ſorts, their *Heads* are either *Erazed*, *Couped*, or *Caboſed*; and ſometimes the *Face* only of a *Lion*, or *Leopard*, is born. The *Attires* or *Horns* of a *Buck* are uſed in Wearings; alſo the *Paws* and *Tails* of *Lions* and *Bears* are uſed both *Erazed*, and *Couped*.

There are ſeveral *Monſtrous Animals*, ſuch as are exorbitant from the general courſe of Nature, either for Qualities, or Eſſence, that are Born in *Armory*; and ſuch are *Amphibious Beaſts*, as *Otters* and *Beavers*, that live both on the Land and in the Water. Alſo thoſe of a prodigious Shape being formed, or rather deformed with the confuſed Shapes of Creatures of different kinds and qualities; and ſuch are *Bats*, *Harpres*, *Wiverns*, *Cockatrices*, *Mermaids*, and *Dragons*.

There are divers Creeping Things that are Born in *Coat-Armour*, as *Tortoiſes*, *Moles*, *Hedg-Hogs*, *Snails*, *Scorpions*, *Adders*, *Emmets*, *Graſs-hoppers*, *Spiders*, *Toads*, &c.

AREAL ANIMALS, as *Fowl* and *Birds*, are much uſed in *Heraldry*, which may be conſidered by their *Feet*, which are either whole and webby, as the *Palm* of a Mans *Hand*, as the *Swans*, *Geeſe*, *Ducks*, &c. or divided, as the *Eagles*, *Falcons*, *Ravens*, *Herns*, *Peacocks*, and other *Fowls*, and *Birds* of the *Air*.

All *Fowl* and *Birds* of what kind ſoever, muſt be Born in their natural Actions of going, ſitting, ſtanding or flying.

Concerning the *Beaks* or *Bills*, as alſo the *Feet* of *Birds*, all thoſe that are either *Whole-footed*, or have their *Feet* divided, and yet have no *Tallons*, ſhould be Termed *Membred*; but the *Cock* and all *Birds* of *Prey* muſt be Termed *Armed*. It is generally obſerved, that the *Females* of *Birds* of *Prey* are the nobleſt and the moſt hardy, which Nature hath ſo ordered, for that ſhe takes care of her young.

The *Parts* and *Members* of *Fowl* are uſually Born both *Couped* and *Erazed*.

The more fierce the *Bird* is, the better it is eſteemed in *Heraldry*; ſo that the *Eagle*, which is the Prince of the *Air*, hath the preheminence of all others.

Fiſh are not of that eſteem as *Beaſts* or *Fowl*, yet much uſed; and as *Birds* have their *Plumes*, *Wings* and *Trains* for cutting their paſſage through the *Air*, ſo have *Fiſh* their *Fins* by which they guide themſelves, cutting the Current of the Streams, their Courſe being directed by their *Tayl*, which ſerveth as the *Helm*, or *Ruther* of a *Ship*.

Fiſh are Born after a diverſe manner, *viz.* directly *Upright*, *Imbowed*, *Extended*, *Indorſed*, *Reſpecting* each other, *Surmounting* one another, *Fretted*, and *Trianguled*, &c.

All *Fiſh* that are Born Feeding, muſt be Termed *Devouring*, expreſſing what they feed upon. All *Fiſh* raiſed directly *Upright*, that have *Fins*, muſt be *Blazoned Hauriant*; and all born Tranſvers muſt be *Blazoned Naiant*, or *Swiming*. *Fiſh* are likewiſe Born in part, as the *Claws* and the *Shells*.

All theſe ſundry ſorts of *Bearings* aforeſaid taken notice of, are Born in *Fields* ſingle or more than one; 3 or 6 are the uſual Number. They are alſo Born between, and charged upon the *Honourable Ordinaries*; Examples of all which are given in ſome Volumes of *Heraldry* publiſhed by me, Entituled *Guillims Diſplay of Heraldry*, in *Folio*. An *Eſſay to Heraldry* in *Octavo*, and in a *Map* of *Heraldry*, Entituled *Heraldry Royal*, comprehending the *Body* of the ſaid *Art*, Illuſtrated with apt and proper *Figures*.

But I have given ſome Examples thereof in the ſaid Plate of *Arms* here inſerted, beginning at Number 110, which are thus *Blazoned*; Gules, 3 *Katherine-Wheels* Or. 111, Sable, 10 *Billets*, 4, 3, 2, and 1, Argent. 112, Or, a *Manch* Gules. 113, Gules, 3 *Mallets* Or. 114, Azure, a Cheveron between 3 *Bells* Or. 115, Gules, a *Fret* Argent. 116, Argent, *Fretty Sable*. 117, *Ermin*, on a Croſs-Quarter piereed Argent 4 *Ferdemolins* Sable. 118, Azure 3 *Lozenges* Argent. 119, Gules, a *Muſcle* Argent; 120, Argent on a Mount Proper, a *Tower triple Towered* Sable. 121, Azure, a *Cheveron* between 3 *Tents* Argent. 122, Gules, 3 *Clarions* Or. 123, Azure

3 *Banners* diſplayed in *Bend* Gules. 124, Ermine, a *Croſs-Bow* in pale *Bent* Gules. 125, Gules, 3 *Trumpets* Or. 126, Argent, a *Culverin*, *Dismounted*, in *Feſs* Sable. 127, Argent 3 *Battering Rams* Barways Proper, headed Azure, Armed and Garniſhed, Or. 128, Argent, 3 *Scaling Ladders* in Bend Sable. 129, Ermin, 3 *Long Bows* in Pale bent Gules. 130, Azure, 3 Arrows Argent. 131, Gules, 3 *Pheons* Argent. 132, Azure, 3 *Spears-Heads*, Argent. 133, Gules, 3 *Anchors* Or. 134, Azure, 3 *Helmets* Argent. 135, Azure, 3 left Handed *Gauntlets* Or. 136, Gules, 3 *Water-bougets* Or. 137, Argent, a *Sword* erected in *Pale*, *Sable*. 138, Azure, 3 *Swords* in *Pale*, two with their Points downwards, the middlemoſt upwards, Argent. 139, Gules, 3 *Swords Barways* their Points towards the ſiniſter Point of the *Eſcocheon* Argent, pomeled Or. 140, Azure, a *Sun* in his Glory. 141, Or, a *Sun Eclipſed*. 142, Gules, an *Increſcent* Or. 143, Azure, a *Moon* in her *Complement*, or *Glory*, Argent. 144, *Azure*, a *Moon Decreſcent* proper. 145, *Argent*, a *Moon* in her Detriment Proper. 146, Azure, 3 *Creſcents* Argent. 147, Argent, 3 *Stars* of 6 *Rays* Sable. 148, Or, 3 *Mullets pierced* Sable. 149, Argent, 3 *Oaken Leaves pendant* proper. 150, Or, 3 *Laurel Leaves ſlipped* proper. 151, Argent, 3 *Holly-Leaves bendways* Azure. 152, Or, 3 *Fig-Leaves barways* proper. 153, Argent, 5 *Vine-Leaves* in *Saltier* proper. 154, Gules, a *Limb* of a *Tree Ragaled* and *Trunched* in *Bend* Argent. 155, Azure, 3 *Cinquefoils* Argent. 156, Gules, a *Cock* or *Wheat-Sheaf*, Or. 157, Azure, a *Flower-de-Lis* Or. 158, Ermin, 3 *Roſes Gules*, *ſeeded* and *barbed* proper. 159, Argent, a *Mans Leg erazed* at the *Thigh*, Sable. 160, Gules, 3 *Dexter-Arms conjoyned* at the *Shoulders*, and *flexed* in *Triangle*, Or. 161, Azure, 3 *Siniſter-Hands* couped at the *Wriſts*, Argent. 162, Argent, an *Arm Siniſter* iſſuing out of the *Dexter Point*, and extended towards the *Siniſter Baſe* in form of a *Bend*, Gules. 163, Or, a *Mans Leg* couped at the *Thigh*, Azure. 164, Gules, a *Sarazens Head erazed* at the *Neck*, Argent; and enviroued about the *Temples* with a Wreath of the Second, and Sable. 165, Argent, on a *Cheveron* Gules 3 *deaths Heads* of the Field. 166 Sable a *Shin bone* in *Pale*, Surmounted of another in *Croſs*, Argent. 167, *Guttes*; Theſe *Drops* are of different natures, according to the *Colour*, for they ſtill retain their ſhape. If *Gules*, they are *Gutte de Sang*, that is, *Drops of Blood*. If *Azure*, *Gutte de Larmes*, which are *Tears*. If *Argent*, *Gutte de Eau*, which are *Drops of Water*. If *Sable*, *Gutte de Poix*, which are *Drops of Pitch*: And if *Tellow*, *Gutte d'Or*, or *Drops of Gold*. 168, Or, a *Lion Rampant* Gules Crowned, Argent. 169, Argent, a *Lion Rampant Gardant* Sable. 170 Sable, a *Lyon Rampant* Regardant, Or. 171, Gules, a *Lion Saliant* Argent. 172, Argent, a *Lion Rampant Coward* pure. 173, Or, a *Lion Rampant double Teſte*, Azure. 174, Azure, a *Lion Rampant double Queve*, Argent. 175, Or, 2 *Liocels Rampant Combatant*, Sable. 176, Gules, a *Lion Paſſant* Argent. 177, Azure, a *Lion Paſſant Gardant* Or. 178, Vert, a *Lion Seiant* Argent. 179, Or, a *Lion Couchant* Sable. 180, Gules, a *Lion dormant*, Or. 181, Vert, a *Grey-Hound* currant in *Bent*, Argent; *Collered*, *Gules*. 182, Vert, a *Buck tripping* Or. 183, Argent, a *Lions Head erazed* Gules. 184, Gules, a *Horſes Head Couped* Argent. 185, Azure, a *Bucks Head Caboſed* Or. 186, Vert, a *Cheveron* between 3 *Leopards Faces* Or. 187, Gules, 3 *Lions Paws erazed* Argent. 188, Sable, 3 *Bears-Paws couped*, and *erect*, Argent. 189, Azure, an *Eagle diſplayed* Argent. 190, Argent, an *Eagle diſplayed* with two *Heads* Sable. 191, Argent, a *Raven* proper. 192, Azure, 3 *Cocks* Argent, *Armed*, *Creſted*, and *Wattled* Or. 193, Or, 3 *Martlets* Sable. 194, Azure, a *Harpre* Or. 195, Azure, 3 *Buſtarts riſing* Argent. 196, Gules, 3 *Bees volant* or *arriere* Argent. 197, Or, 3 *Eagles Heads erazed* Sable. 198, Sable, 3 *Eagles Legs erazed a la Quiſe* Argent. 199, Or, 3 *Eagles legs Barways Erazed a la Quiſe* Sable; *Armed* Gules. 200, Vert, a *Tortoiſe paſſant* Argent. 201, Azure, a *Tortoiſe erected* Argent. 202, Sable, 3 *Houſe Snails* Argent. 203, Azure, 3 *Dolphins Naiant* Argent. 204, Vert, a *Dolphin Naiant Imbowed* Argent. 205, Gules, 3 *Salmons Hauriant* Or. 206, Azure, 2 *Barbels Hauriant Regarding* each other, Argent. 207, Gules 2 *Bikes Hauriant Endorſed* Or. 208. Sable, 3 *Scallop-Shells* Argent.

Marſhalling and Impaling of Coats in one Shield.

BY *Marſhalling* of *Coats* is to be underſtood, an orderly diſpoſing of ſundry *Coat-Armours* pertaining to diſtinct *Families*; and ſome have their place within the *Eſcocheon*, and ſome without; Of thoſe within, ſome have their Occaſions obſcure, and others manifeſt, as are thoſe whoſe *Marſhalling* (according to ancient form) do betoken *Marriage*, or ſome gift of the *Sovereign*: ſuch as do betoken *Marriage*, repreſents either a Match ſingle, or Hereditary: By a ſingle Match is meant the *Conjoyning* or *Impaleing* the *Coat-Armour* of the *Man* with that of the *Woman*; but if the be an *Heireſs*, then her *Coat* is to be born in an *Eſcocheon* of *Pretence* in the midſt of his *Shield*. It is alſo accuſtomary for *Biſhops* to *Impale* on the *Dexter-Side* of the *Shield*, the *Arms* belonging to their *Biſhoprick*; And if a Man hath had more than one Wife, the way of Bearing them is to *Impale* them betwixt his own *Coat*, which is to be in the middle part of the *Sheild*.

External Ornaments.

EXternal *Ornaments* are *Helmets*, *Torces*, *Caps*, *Crowns*, *Creſts*, *Mantlings*, *Eſcroles*, and *Supporters* to *Noble-Men*.

The *Helmet* is placed next above the *Eſcocheon*, or *Shield*, to all under the Degree of a *Noble-Man*, and to thoſe there is a *Crown*, according to the Quality of the *Bearer*, and the *Helmet* iſſueth out of the ſaid *Crown*. The *Helmet* doth diſtinguiſh the Dignity of the *Bearer*; for to a *Gentleman*, and *Eſquire*, the *Helmet* is placed Side-ways with the *Beaver* cloſe; To a *Knight*, or *Baronet*, (which is all one) the *Helmet* is placed Fore-right, with the *Beaver* open. The Full-faced or Fore-right *Helmet* doth ſignifie *Direction*

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rection and *Command*; the close, *Attention*, and *Obedience*.

The open *Helmet* placed Side ways, with *Bars*, belongs to all the *Nobility* under the Degree of his *Majesty*; except *Soveraign Dukes*, or of the *Royal Blood*; and to those the *Helmet* is placed Fore-right with open *Bars*; all which doth appear in the Circle of the *Eliptical Table*, as doth the several sorts of *Crowns* and *Coronets*, born by the *Nobility*, of which a word or two.

The *Barons Coronet* is with six *Pearls* of an equal heighth, and distance, from each other.

The *Viscounts Coronet* is composed only of *Pearls* set close together, and of an equal height.

The *Earls Coronet* is composed of *Points* and *Flowers*, and the *Points* are spiry with *Pearls* on the top above the *Flowers*.

The *Coronet*, or *Crownet* of a *Marqueß*, is of *Leaves* and *Points*, with the *Leaves* or *Flowers* above the *Points*.

The *Coronet* of a *Duke* is only *Floral*.

The *Coronet* or *Crownet* of a *Prince* is the same with the *Crown* of a *King*, only the *Arches*, *Mound*, and *Croß* are omitted.

The *Crown* of a *King* is as a *Duke*, but with *Arches*, a *Mound* and a *Croß*.

To a *Bishop*, instead of a *Coronet* belongs a *Miter*.

Next above the *Helmet* is the *Wreath* or *Torce*, which is always of the principal *Metal* and *Colour* in the *Bearers Paternal Coat*; and on this *Torce* the *Creß* is placed, except to those *Coats* that have no *Wreath*, and then there is always instead therof a *Mount*, *Hill*, *Cheapeau*, or *Coronet* on which the *Breaß* is placed.

About the *Shield* is the *Mantle*, which doth admit of several Forms, those most used are the *Cloak-Mantles* and the *Folding Mantles*; and the *Colours* are generaly *Gules* and *Argent*, that is, *Mantled Gules*, doubled *Argent*. But to *Noble-Men* instead of *Argent* the Doubling is *Ermins*.

On each side of the *Shield* of *Noble-Men* are the *Supporters* which stand on an *Escrole*, or on a *Hill*. The *Escrole* is at the Bottom of the *Shield*, in which is placed the *Motto* of the *Bearer*, which is altogether according to the Fancy, and alterable at pleasure.

An Example of all which *External Ornaments* will appear by his *Majesties Royal Atchivement*; with the differences of other *Bearings* in the *Catalogue* of the *Arms* of the *Subscribers* to this *Work*, placed at the beginning of the *Book*, to which I refer the *Reader*.

The End of the First Part.

THE

GENTLEMAN'S RECREATION:

TREATING OF

HORSMANSHIP, HAWKING, HUNTING, FOWLING, FISHING, and AGRICULTURE;

WHICH

Are Collected from the most Authentick AUTHORS, and the many gross Errors therein corrected; with great Enlargements made by those well-experienced in the respective RECREATIONS.

And for the better Explanation thereof, great variety of useful SCULPTURES, as NETS, ENGINES, TRAPS, &c. are added for the Taking of BEASTS, FOWL, and FISH; not hitherto published by any.

The whole illustrated with divers Ornamental SCULPTURES, Engraven in Copper, relating to the several Subjects.

The Second Part:

LONDON,

Printed for the Undertaker *Richard Blome*, *Anno Domini* 1686.

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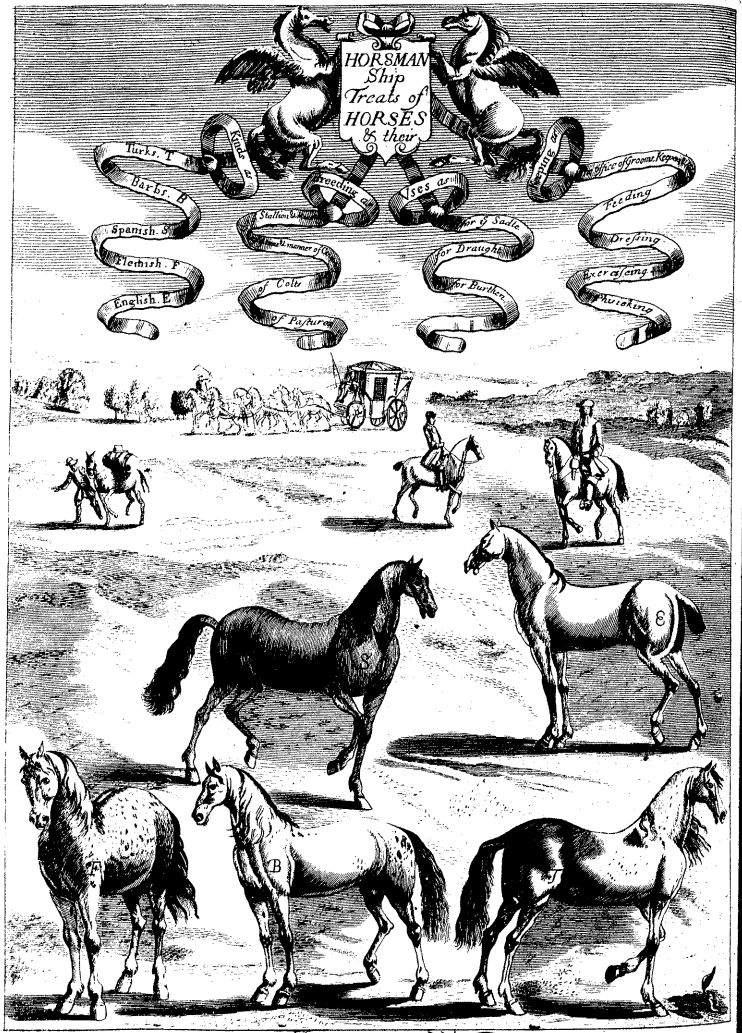
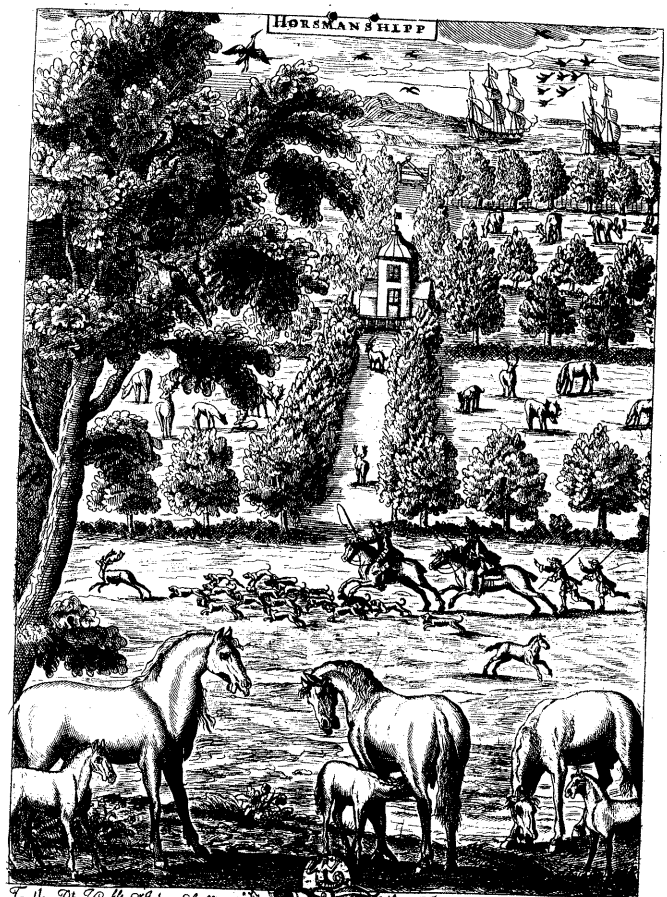


To the Honourable Luffingham in third son of ye Right Noel Viscount

John Noel of Rutlandshire Esqr. Honourable Baptist Camden &ca.

This plate is humbly Dedicated by Ric. Blome.



To the Rt. Honble. Sr. John Skeffington Baron of Loughneath; Viscount Governour of ye County of Londondery the Lords of his Maty. most Honble. Ireland &ca.

of Fisherwick in Staffordshire Bart. Massereene, Custos Rotulorum &c., and Towne of Coleraine & one of privy Councell of ye Kingdom of

This plate is humbly dedicated by Richard Blome.

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HORSMANSHIP.

PART I.

Wherein is treated of Horſes, *their Kinds, Breeding, Keeping, Uſes,* &c.

CHAP. I.

The Introduction.

A *Horſe* is a Creature ſo excellent in his nature, and ſo generally uſeful, that all ranks and degrees of Men, either for pleaſure or profit, are glad to make uſe of his Service. If you have ſeen a *General* at the head of his *Army*, and taken notice of his *Horſe* under him, I need not tell you what an Air of Majeſty and Greatneſs that Noble Creature has; and if you have been in a *Battle*, to give you an account of his Vigour, Activity, and Courage is as needleſs: But if you are a ſtranger to theſe ſort of things, and ſeek not a *Horſe* for any ſuch Imployment, go to the *Huntſman*, the *Traveller*, and the *Husbandman*, they will all tell you what pleaſant Companions and neceſſary Servants *Horſes* are. It would be endleſs to give a particular Account of their admirable nature and great uſefulneſs; but if you conſider what long Journeys are performed on *Horſback*, and in *Coach*; what heavy Loads and Burthens are drawn and carried from place to place in *City*, *Camp*, and *Country*; what delight and pleaſure is taken in *Hunting*, *Hawking*, *Racing*, &c. to the increaſing of Health and Vigour: In a word, if you conſider that to the moſt glorious *Triumphs* and ſolemn *Pomps*, in buſineſs of all ſorts, and in our pleaſanteſt and moſt manly Recreations, a *Horſe* is ſome way or other aſſiſting; you cannot but conclude, That of all thoſe Creatures that are made for the profit and delight of Mankind, a *Horſe* is the moſt excellent, and conſequently, That *Horſmanſhip* is a very great Accompliſhment in a Perſon of Quality, or Gentleman.

The Deſign therefore of this Diſcourſe is to lay down the Principles of *Horſmanſhip* in a ſhort and clear method; I think it may be called The *Knowledge* of *Horſes*, and the *Art* of *Riding* well. I ſhall ſpeak only of ſuch things as are moſt uſeful and neceſſary to be known by the Gentry; as the ſeveral kinds of *Horſes*, the Rules for *Breeding* and *Keeping* them, what uſes ſeveral ſorts of *Horſes* are fitteſt for, and the like; avoiding the impertinent humour of too many *Authors*, who endeavour nothing more than to make a ſhow of their own Knowledge, and nothing leſs than the benefit and advantage of thoſe for whom they write. If I ſhould treat at large, ſome parts of this Diſcourſe would require Volumes; and therefore when I ſpeak in general, and give only the Grounds of things, I hope it will not offend the *Reader*. It may be of uſe to him who is a good Proficient, and not an improper *Grammar* for one that is beginning to learn; and I doubt not of its Approbation by the Judicious and experienced Horſman.

CHAP. II.

Of the ſeveral ſorts of Horſes moſt in uſe.

Of the Turkiſh Horſe.

THe *Turkiſh Horſe* has a great deal of beauty and fire, being extraordinary ſwift; with a good *Mare* he breeds very fine *Colts*, (eſpecially for the *Race*) of which ſome of our *Breeders* have had the experience: But the *Turks* are ſo unwilling to part with their Breeds, that of thoſe that come into *England*, there are but very few (if any) good in their kind.

Of the Barb, or Barbary Horſe.

THe *Barb* is very docile and gentle, being of all *Horſes* in the World the eaſieſt to be managed, having naturally a very graceful Action, and a good Diſpoſition; he is of himſelf ſo

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negligent and lazy in his walk, that he is apt to ſtumble even ſometimes in plain Ground; but when he is wakened, and rode upon his mettle, no *Horſe* is more nimble, vigorous and adroit, and better for an Action of one or two hours. He makes a good *Stallion* to breed *Running Horſes* out of, the *Colts* that he gets being generally well winded, fleet and good at bottom. The Duke of *Newcaſtle* was of Opinion, That a *Barb*, though a Jade, would get a better *Horſe* for a *Courſe* than the beſt *Running Horſe* in *England*; and ſo was Sir *John Fenwick* of *Northumberland*, being a Man of great experience, and eſteemed to have one of the beſt Breeds of Horſes in this Kingdom. The Duke of *Newcaſtle* was likewiſe of Opinion, and not without reaſon, That the choiceſt *Barbs* are not brought over: And his Reaſons are, becauſe they are bought up by *Merchants*, or ſuch that buy the cheapeſt for advantage; nor do they know how to chooſe thoſe that are good.

Of the Spaniſh Horſe.

THis *Horſe*, if he be well choſen, is of a noble Kind, his Shape being exact and curious, not ſo thin and ſlight as the *Barb*, nor ſo groſs as the *Neapolitan*, but between both, being formed by Nature for ſtrength as well as beauty. He is very docile, hath a great ſpirit and courage; And 'tis credibly reported of their beſt Breeds in *Spain*, that in their Exerciſe of *Riding* at the *Bull*, when a *Horſe* happens to be ſo ſharply wounded that his *Guts* hang out, he will yet obey his *Rider*, and continue his Action to the utmoſt of his ſtrength, though at the ſame time he tramples upon his Bowels. He hath the proudeſt walk and Trot, with the beſt action in his trot, the loftieſt Gallop, the ſwifteſt Careers, and yet is the gentleſt *Horſe*; and if he be good in his kind, is very proper for *Generals* and great *Officers*, none being more graceful in a day of *Triumph*, or uſeful in a day of *Battel*.

Of the Dutch or Flanders Horſe.

THere are a ſort of *Dutch* or *Flanders Horſes* which we make uſe of in *England*, which are the fitteſt in the World for the *Coach*; eſpecially for the Town for a fine Equipage, where they muſt draw great weight, and be continually upon the *Stones*; for they are large and beautiful in their Kind, and having a graceful and lofty trot, they give a better Air to a *Coach* than any *Horſes* whatſoever; beſides that, they are ſtronger, and will endure the Pavement better.

Of the Engliſh Horſe, &c.

WE have in *England* ſeveral good Breeds; our *Running Horſes*, *Hunters* and *Pads*, and our *Horſes* for all manner of fatigue of what nature ſoever, are not to be matched in all *Europe*; nor is any *Horſe* better for an *Officer* in the *War*, than one of thoſe which we call our *Twelve-Stone Horſes*, (ſuch as uſually run for *Plates*) if he be well choſen, and taken in time. He muſt be naturally of a good diſpoſition (which for the generality our *Engliſh Horſes* are not) and one of the ſtrongeſt of that ſort, with good *Reins* and *Limbs*, and a *Head* well ſet on; and he muſt be put to the *Manage* before he is accuſtomed too much to go upon his *Shoulders*, and to have his Will; for I believe that which ſpoils a great many of our *Engliſh Horſes*, rendring them ſo unfit for the *Great Saddle*, is the *Snaffle Bridle*, and our particular method of *Training* and *Galloping*, ſo that when they come to be 7 or 8 years old, they are grown ſo Head-ſtrong, and their way of going is become ſo cuſtomary, that there is no poſſibility of putting them upon the *Haunch*, or bringing them into any manner of Subjection, either of the *Hand*, or *Heel*.

There are ſeveral other kinds of *Horſes*, which I omit, becauſe we meet with them but rarely in *England*, amongſt which may be reckoned the *Arabian*, a *Horſe* of an excellent nature, and very beautiful.

CHAP. III.

Of Stallions.

IF you would chooſe a *Stallion* aright, you muſt conſider the uſe you deſign to breed for; for Example, if you would breed for the *Manage* (I mean the moſt uſeful part which is termed *Manage de Guere*, of which I ſhall ſpeak in its proper place) let your *Stallion* be a *Turk*, *Barb*, or *Spaniard*, one that is good in his kind, and naturally of a docile and gentle Temper, though lively, vigorous, and bold in Actions. His *Neck*, and *Creſt* muſt be ſo turned, and his *Head* ſo ſet on, as not to hinder his reining well; for which you muſt obſerve that his *Neck* be formed like an Arch, his *Creſt* not too much charged with Fleſh, his *Head* when he ſtands in his own natural poſture, falling as it were perpendicularly towards the ground, and his *Jaw-Bones* ſtanding ſo wide, that his *Head* may not want room to play.

If you would Breed for *Hunting*, or the *Race*, make choice of a *Turk*, or *Barb*, or a Well-bred *Engliſh-Horſe*, that ha's given proofs of his Goodneſs and Speed.

If you would Breed for the *Road*, make choice of a good ſtrong *Hunter*, that has naturally good *Legs* and *Feet*, a ſhort *Back*, and good *Quarters*, and let him be one that is not of a Skittiſh, or Stubborn Temper; or if you are curious and would have very fine *Padds*, you may take the ſame meaſures which I told you before for the *Manage*, only Geld your *Colts*, and when you break them, if they take it well, let them be taught to *Amble*.

Ti's needleſs to give directions for Breeding any other ſorts of *Horſes*; As for the *Coach*, *Wagon*, *Cart*, *Servants*, and all manner of Drudgery, becauſe there is not that Nicety required in their Breed; and from the *Fairs* and *Horſe-Courſers* you may be ſupplyed, and ſave that trouble.

CHAP. IV.

Of Mares.

HAving told you how to chooſe your *Stallions*, it will be neceſſary to give you ſome directions about the *Mares*; and certainly none in the World are better to Breed on than our *Engliſh*, provided you Suit them to your particular deſign; for inſtance, if you would Breed for the *Manage* or *Pads*, let your *Mares* have fine *Fore-hands*, with their *Heads* well ſet on, but not too long *Necks*; broad *Breaſts*, large and Sparkling *Eyes*, and great *Bodies*, that their *Foals* may have room enough to lye; with good *Limbs* and *Feet*; let them be of a gentle and good diſpoſition, and their motions naturally nimble and Graceful; In a word, remember always that the more good qualities your *Mares* have, the better will your *Colts* generally prove.

If you would Breed for the *Race*, and *Hunting*, your *Mares* muſt be lighter, with ſhort *Backs* and long *Sides*; their *Legs* muſt be ſomething longer, and their *Breaſts* not ſo Broad, and always make choiſe of ſuch as you are ſure have good Blood in their *Veins*. If you have tryed the *Speed*, and *Wind* of any particular *Mare*, and find it good, you may the ſurer expect a good *Colt*, provided ſhe be ſtill in her full Health and Vigour, and not above Seven years old, or eight at moſt; for the younger your Breeders are, the better the *Colts* will be.

CHAP. V.

Of a Soil fit to Breed in, and of Paſtures.

ONe of the firſt things (which you ought to conſider) if you deſign to Breed, is the commodiouſneſs of the Place, and the Paſtures where your *Horſes*, *Mares*, and *Colts* are to run. For he that Breeds in a place unfit for it, loſes his Mony and Pains, and will never have good *Horſes*.

The *Ground* muſt not be too rank of Graſs, nor too bare, but a firm and ſweet Soil Situate in a clear and wholeſom Air, where there are *Hills*, and running Waters, with *Quick-ſetts*, and ſpreading Trees to ſhelter them from the *Wind*, *Rain* and *Sun*. Nor muſt they be continued always in the ſame *Paſtures*, but often removed into freſh, obſerving ſtill to put them into the Shorteſt feedings in Summer, and the Richeſt in Winter, at which time of the year they muſt have a *Hovel*, a *Hay-Rick*, or ſome convenient place to defend them from the Weather.

CHAP. VI.

Of the Time and Manner of Covering.

YOur next Care muſt be about the Time and Manner of *Covering*. The beſt time to have your Mares Covered is in *May*, for then your *Colts* will fall the *April* following, at which time there will be ſweet and freſh Graſs for them; the manner is as follows; Let your *Stallion*, having eaten Graſs for ſome time before, and been ſo high fed, that he is full of luſt and vigour, be brought to the place where your Mares are (his hinder Shoes being taken off) there let him Cover a *Mare* in hand twice or thrice to make him ſober, then pull off his Bridle and turn him looſe to the reſt of the *Mares*, which muſt be in a convenient Cloſe, not without ſtrong *Fences* and good *Food*; and thus you muſt leave him till he has covered them all, ſo that they will take *Horſe* no more, by which time his Courage will be pretty well cooled: More than ten or twelve *Mares* is too much for one *Horſe* in the ſame year. You muſt have ſome little *Houſe* or *Hovell* to defend him from the *Rain*, *Sun* and *Weather* (which are very weakning) and a *Manger* to feed him in during the time of Covering; and you would do well to have one to watch him all the while for fear of danger, and the better to know how often he covers each *Mare*. All this being obſerved, when you have taken away your *Stallion* remove your *Mares* into ſome freſh *Paſtures*.

CHAP. VII.

Of Colts.

WHen your *Colts* are fallen, you may let them run with their Dams till about *Michaelmaſs* (ſooner or later, according as the Cold weather comes in,) then you muſt wean them, and let them be kept in a convenient Houſe with a low *Rack* and *Manger* for their *Hay* and *Oats*, which muſt be ſweet and good, with a little *Wheat-bran* ſometimes mixt with the *Oats*, to cauſe them to drink and keep their Bodies open; and above all they muſt be kept from Wet and Cold, which are the hurtfulleſt things imaginable to them, nothing being more tender, as the Duke of *Newcaſtle* in his Book proves more at large. For proof of this take a *Spaniſh Stallion*, and let him Cover two *Mares*,

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which for age, beauty and comlineſs may admit of no difference betwixt them, and if they be both *Horſe-Colts*, or both *Fillies* (which is one and the ſame) let one run abroad until it be Three years and an half old, and let the other be Houſed every Winter, kept warm, and orderly tended, as aforeſaid; and that *Colt* that hath been kept abroad ſhall have great fleſhy Shoulders, flabby and gouty Legs, weak Paſterns, with ill Hoofs, and ſhall be a dull and heavy Jade in compariſon to the other, which is Houſed and orderly kept as aforeſaid; which will have a fine Fore-hand, be well ſhaped, have good *Legs* and *Hoofs*, and be of good ſtrength and ſpirit: By which you may underſtand, that to have the fineſt *Stallion* and the beautifulleſt *Mare* is nothing, provided you ſpoil them in their *Breeding*.

It is not amiſs to let your *Colts* play an hour or two in ſome *Court-yard*, or the like place, when 'tis fair weather; provided you put them up again carefully, and ſee that they take no hurt.

When the *Winter* is ſpent, let them be turned into ſome dry Ground where the *Graſs* is ſhort and ſweet, and where there is good Water that they may drink at pleaſure; for it is not neceſſary that a *Colt* immediately fill his Belly like a Horſe that labours hard. The next *Winter* you may take them into the Houſe, and uſe them juſt as your other *Horſes*. But let not your *Horſe-Colts* and *Fillies* be kept together after the firſt year. This Method you may obſerve every Summer and Winter till you break them; which may be done after Three years old, and will be ſo eaſie a thing, if you obſerve the aforeſaid Method of Houſing them and ordering them the Second year, as you do other *Horſes*, that they will be ſo tame and gentle, that you need not fear their *plunging*, *leaping*, *kicking*, or the like *Coltiſh tricks*, for they will take the Saddle quietly: for all theſe ridiculous ways of Beating and Cowing them to tame them, is in effect ſpoiling them, what ere they call it, in plowed Fields, deep Ways, or the like; inſtead of which let their Rider ſtrive to win them by gentle uſage, never correcting them but when it is neceſſary, and then with Judgment and Moderation.

You need not a *Cavezone* of Cord, which is a *Head-ſtrain*, nor a Pad of *Straw*, but only an ordinary *Saddle*, and on his Noſe an ordinary *Cavezone*, as you Ride other Horſes with; but it muſt be well lined with double Leather, as the reſt are, and if you think fit, you may put in his Mouth a Watering-Bit without *Reins*, only the *Head-ſtall*, and this but for a few days, and then to put ſuch a *Bit* as he ſhould be always rid with: And be ſure uſe not *Spurs* for ſome time after *Backing*.

Obſerve, that *Tearlings* muſt be kept abroad together; ſo thoſe of Two years old together; the like for thoſe of Three *Tearlings*, which ordering is moſt agreeable to them.

CHAP. VIII.

Of the ſeveral Uſes of Horſe, to Men of Quality and Gentlemen.

THE ſeveral Uſes of *Horſes* to Men of *Quality* and *Gentlemen*, may be reduced to theſe three Heads, *viz.* for the *Saddle*, *Burthen* and *Draught*. The Uſes of the *Saddle*, are for the *War*, *Hunting*, the *Race* or *Pad*; of *Burthen*, for *Sumters*, *Packs*, and ſuch kind of Baggage; and of *Draught*, for the *Coach*, *Carriages*, *Waggens*, *Carts*, *Plough*, and the like.

A *Horſman* ſhould conſider theſe things, that every *Horſe* may be put to the uſe he is fitteſt for, concerning which I refer you to the five following Chapters, which treat of Riding the *Great Horſe*, of *Hunting*, of the *Race*, of the *Pad*, of the *Coach*, &c.

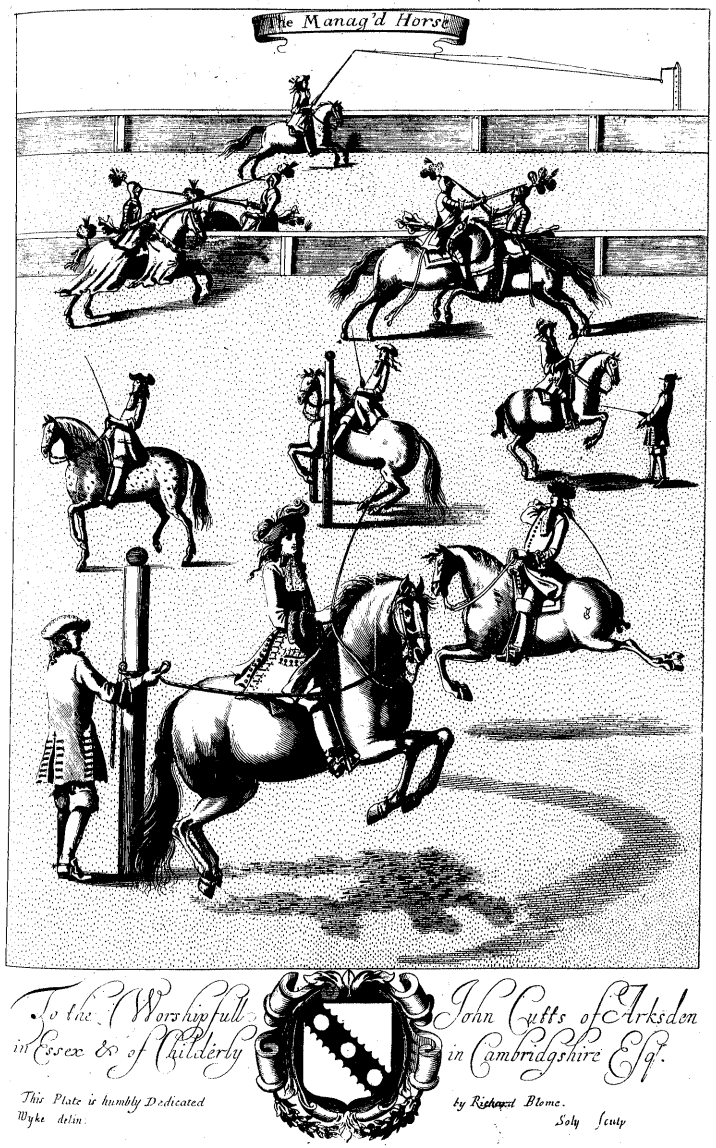
CHAP. IX.

Of Riding the Great Horſe.

THere is certainly no Exerciſe more Noble and Manly than this of the *Manege*; It makes a man firm and eaſie on Horſeback, and vigorous and adroit in Action: It increaſeth health and ſtrength; for none under the ill conſequences of a Debauch, be it of *Wine* or *Women*, can perform this Exerciſe as he ought, being as unfit for it in ſuch a caſe, as to go to Bed to a fair Lady: It alſo gives a graceful and Martial Air, which one may perceive in ſome fine *Horſmen*, (even when they are on foot) and therefore when the *French* would commend any Perſon that has a good Mean, they ſay *Il a l' Air fort Cavalier*.

We may conſider it in two parts; Firſt, that ſort of *Manege*, which is proper for the *Cheval d' Eſcole*; Secondly, that which is proper for the *Cheval de Guere*. The *Cheval d' Eſcole* is taught ſeveral *Airs* and *Leſſons*, which as they require a great deal of Vigour and Addreſs (as the *Gallopade-Relevée*, *Capriples*, *Ballotades*, &c.) ſo they are neceſſary to be learnt in *Academies*, to give young Men a firm, and eaſy *Seat*, and a good *Hand* upon a *Horſe*; making them capable of humouring all manner of *Horſes* according as it is requiſite; but are not in themſelves, abſolutely neceſſary, nor of any uſe in Action, unleſs at *Carouſels*, *Triumphs*, and the like. The *Cheval de Guere* is taught only ſuch *Leſſons*, as are neceſſary in the *Field*, and without which one cannot attack a good *Horſeman* but upon very great diſadvantages.

The confounding of theſe two, and not being able to diſtinguiſh the one from the other, makes a great many talk very ignorantly about *Manag'd Horſes*, ſome deſpiſing the whole Art of *Riding* the *Great Horſe*, becauſe for want of Education they know


The Manag'd Horse
To the Worshipfull John Cutts of Arksden
in Essex & of Childerly in Cambridgshire Esq.
This Plate is humbly Dedicated by Richard Blome.
Wyke delin. Soly Sculp

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know nothing of it, whilſt others are ſuch formal *Academiſts*, that they pretend every *Leſſon* is as neceſſary in Action, as *Stopping*, *Turning*, and the like: Both theſe are in the wrong; the firſt through Ignorance, the latter too often through Affectation; and I believe Miſtakes of this nature have been partly the cauſe why the *Great Saddle* has been ſo ſlighted and neglected in *England* for ſome years paſt: But the preſent *King* is a Lover of *Marſhal Exerciſes*, and therefore we may hope to ſee them Flouriſh more than they have done; in order to it, his *Majeſty* ha's been pleaſed to make choiſe of *Monſieur de Foubert* (for the Governing of an *Academy*) one of the beſt *Maſters* in *Europe*, a Well bred, Good natured, and Ingenious Perſon, who ha's a *Stable* of very fine *Horſes*, and the beſt *Maſters* for all ſorts of *Exerciſes*, that are neceſſary for the accompliſhment of a *Gentleman*. In a word, one that neither wants neceſſary qualifications, nor ſpares any pains to teach and improve the Youth committed to his charge in all things that are to be learned in an *Academy*.

But (to return to my buſineſs in Hand) the *Manege d' Eſcole*, and the *Manege de Guere* muſt both of them be learnt by every one that deſigns to be a good *Horſman*, though 'tis neceſſary to diſtinguiſh the one from the other, that a man may know what *Leſſons* are only for the *Academy*, or the like, and what to make uſe of in the *Field*, or againſt an *Enemy*. A good *Maſter* will make you underſtand the difference; ſo that I need not give you an Account here of all thoſe *Airs*, and *Leſſons* which belong to the *Manege d' Eſcole*; and indeed, it would take up too much room for this deſign: Therefore when you have been long enough in an *Academy* to be firm, and eaſy, and have a good *Hand* upon a *Horſe*, remember to take notice of this diſtinction, that you may know how to chuſe a *Horſe* for the *Field*, or *Action* (for amongſt fifty good *Academy-Horſes* 'tis hard to meet with Ten that are good for the *War*) and take in ſhort, the following Account of the *Qualifications* of a good *Horſe* for *Service*.

In the *Manege de Guere* a *Horſe* muſt be taught to Gallop true, and change readily; to go off from the hand like an *Arrow* from a *Bow*, and ſtop or turn at a Point; to obey the *Hand* and *Heel* in advancing or retiring upon a ſtrait *Line*, or otherwiſe; or in going Sideways to the Right or Left; to Riſe before (*a Courbets*) enough to keep him always upon the *Haunch*; to endure Fire, and to Charge up boldly againſt any thing: And all this muſt be done with willingneſs, eaſe, and ſubjection. For 'tis a Maxim in *Horſmanſhip*, That a *Horſe* muſt never do any thing of his own head, but in obedience to his *Rider*, and no more than he requires of him; as alſo, that a *Horſe* can never perform any Action gracefully or well, that he doth with an averſion and uneaſineſs. This is that which is neceſſary for a good *War-Horſe*, and in this the *Rider* muſt be as perfect as the *Horſe*, otherwiſe he will be ſo far from receiving any advantage from his goodneſs and addreſs, that he will not only find himſelf often out of order (by making his *Horſe* do things *mal à propos*,) but in a little time quite ſpoil him, and make him good for nothing.

But I will not undertake in this Diſcourſe to teach you to *Ride*, it being an *Exerciſe*, that as it is the fineſt and moſt uſeful of all (whatever ſome pretend that never could attain unto it) ſo it is the hardeſt to be perfect in, and is never learnt well without a great deal of Induſtry, as well in the *Practick*, as the *Theorick* part, and that under careful and diligent *Maſters*. It is as neceſſary for a Young man, that deſigns to be a good *Horſman*, to perform his courſe of Exerciſe in an *Academy*; as for him that whould be a great proficient in Learning, to run through his courſe of *Philoſophy*, *Logick*, &c. in the *Univerſity*. I ſhall therefore undertake only to give ſome general Directions which may be of uſe to ſuch as learn and practice this Noble *Exerciſe*. And I can't imagine how a Young man of Quality (when by reaſon of his Tender years he is not ripe enough for Buſineſs and Action) can ſpend his time better, than in learning the Exerciſes of the Body, together with thoſe of the Mind; by which (provided he be under good *Maſters* and *Governours*) he will find ſo great an advantage, that he will not only be fitter to ſerve his *Prince*, when occaſion ſerves, with a vertuous Mind and a ſtrong and active Body; but avoid that lewd Effeminacy and thoſe unmanly Extravagances, which ſo many are ruined by through Eaſe and Idleneſs.

'Tis to be hoped therefore (how negligent ſoever ſome are Educated) that a great many of our Young *Nobility* and *Gentry* will be induced, by their *Parents* Care, or their own Inclinations, to follow the great Example of the *Roman Youth* (who were a glorious Inſtance of the advantage of good Education) and convince the World by their *Actions* and *Behaviour*, that they have ſpent their time as well in the *Academy*, as the others did in their *Campo Martis*.

For the Service of ſuch active and well diſpoſed Youth, I ſhall ſet down theſe following *Rules* and *Directions*; not that a good *Maſter* will omit them, but as they are fundamental Principles of *Horſmanſhip*, 'tis not amiſs to have them in Writing, that by reading and conſidering them, they may never fail to have them at command.

The firſt thing to be conſidered by a Young *Horſman*, is how to Approach and Mount his *Horſe* with ſafety, gracefulneſs, and convenience, which muſt be as follows; If there be but one preſent to aſſiſt him (which may ſometimes happen to Perſons of great Quality in the *War*, or the like) let him place himſelf on the Right-ſide of the *Horſe*, holding his *Head* with one hand and the *Stirrup* with the other; then let him that is to Mount, walk up to the *Horſe*, not directly before him, leſt if the *Horſe* be fearful of him he put him in diſorder, or if merry and wanton he ſhould ſtrike him with one of his Fore-feet; nor behind him for fear of the ſame Accident from his Hind-feet (for a Miſchance falls out ſometimes in a Minute, that has not hapned before in an Age;) but let him approach him on the Left-ſide over againſt the *Shoulder*, inclining ſomething more to his *Head* than his *Flank*; This done, let him examine if the *Bridle* be well placed

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placed in his Mouth, the *Curb* right, his *Girts* faſt, and every thing in good order; and then taking the *Reins* in his Left Hand, and the *Pummel* of the *Saddle* (or a Lock of his *Main*) and laying his Right Hand faſt upon the hinder part of the *Saddle*, let him place himſelf in the *Seat*: And let him endeavour to get a habit of doing this with ſo much caſe and liberty, that his motion may not ſeem forced or painful, nor the Horſe receive any inconvenience, or apprehenſion by his ſwagging him, or falling heavy into the *Saddle*, or bruſhing his *Buttocks* with his right Leg, which are often the faults of unwildy, awkward and heedleſs People.

When he is mounted, having the *Reins* in his Left Hand, with his Thumb upon them, and his little *Finger* between to ſeparate the right from the left *Rein*, let him take the end, (or *Button*) in his right hand, and lifting up his *Arm* with a looſe and careleſs *Air* adjuſt his *Bridle*, ſo that it be neither too long nor too ſhort, and ſo hold it faſt in its proper place, which muſt be three or four Fingers breadth above the *Pummel* of the *Saddle*, and exactly before him. Let him put himſelf from head to foot in the true poſture of a good and fine *Horſeman*. He muſt be placed in the middle of the *Saddle*, (not touching, if poſſible, any other part of it) and reſt upon his *Twiſt*, not his *Buttocks*, keeping himſelf all over ſtraight and caſie, as if he were on foot, his ſhoulders juſt with the right, ſomething forward, his Stomach advanced, holding his Elbows (equally and unaffected) at a little diſtance from his Body; his right Hand at about three or four Fingers diſtance from the left, graſping the handle of his *Switch* or *Sword*, with the point upwards, a little enclining to the Horſes left *Ear*, his *Legs* a little forward, with his *Toes* preſſing firm upon the *Stirrups* near his *Horſes Shoulders*, his Heels lower than his *Toes*, and turned outwards, his *Knees* faſt as if they were glewed, which with the Counterpoiſe of the Body, by obſerving time is all that makes a Man firm on *Horſeback*: Nothing ſhew's a good *Horſeman* more than to ſit Free and Airy, and nothing ſhews more ridiculous than to ſee one ſit in a ſtarch'd and formal way like a Statue.

This is the true poſture of the *Great Saddle*, that he muſt keep himſelf in, what-ever *Airs* or *Leſſons* the *Horſe* performs, allowing only for diſſerent *Aids*, and the various counterpoiſe of the Body, according as neceſſity requires.

The Counterpoiſe of the Body muſt be in *Galloping* ſomething backwards, both for the Graceſulneſs of the Poſture, and that the *Horſe* may with more caſe keep himſelf upon his *Haunch*; the ſame is requiſite in a *Trot*, or any other *Pace*, and eſpecially always in ſtopping, for in that caſe it is not only graceful, and caſie to the *Horſe*, but prevents great diſorder, which arrives ſometimes by a Mans jolting forwards almoſt touching his Horſes Neck. The like is to be obſerved in *Voltes*, *Demy-voltes*, &c. Unleſs a Horſe be rough and Leaps; which if he doth, his Rider muſt obſerve to keep time with him, leaning backwards when his *Croup* is in the Air, and forwards when he riſes before, without confuſion, or diſorder.

And the better to know the different *Aids*, let him take notice and remember, that there is in the *Managed Horſe* two Motions, *viz.* that of the *Shoulders*, and that of the *Haunch*; now that of Shoulder is governed by the *Hand*, and that of the Haunch by the *Heel*.

The motion of the *Hand* is thus, if he turns to the right, he muſt turn his *Bridle-hand*, ſo that his Nails come upwards, removing it little or nothing out of the place: if to the left, he muſt keep it in its own natural poſture without turning, only moving it a little to the left. In both theſe motions he muſt feel his *Horſe's Mouth*, and work it inſenſibly as occaſion requires. When a *Horſe* carries his head in the right place, and ſtedy, his Neck pliant, and obeys theſe *Aids* readily, we ſay he is well in the *Hand*.

The motion of the *Heel* is as follows; when he is *Galloping* upon the *Volte*, *Demi-volte* or the like, and would have his *Horſe* keep his *Croup* inwards (which is neceſſary) he muſt ſtretch out his *Leg* on that ſide to which he turns, and move the other nearer to the *Horſes Belly*, ſo that he may feel the motion. If he would make his *Horſe* go ſideways upon a right line, he muſt firſt put his Shoulders in motion, and then give the ſame *Aids* with his *Legs* as before, and when ever his *Horſe* (of himſelf, as by any accident) throws his *Croup* this way or that way, by moving one of his *Legs* to him, and ſtretching out the other, he will rectifie him. A *Horſe* that is well *Managed* will obey theſe *Aids*, if rightly given, and then we ſay he is well in the *Heel*.

In theſe *Aids* of the *Hand*, and the *Heel*, lies the Art of making a *Managed Horſe* perform all his *Leſſons* with exactneſs, which is not ſo eaſy a thing as ſome imagine, who think if a *Horſe* be perfect, the *Rider* has nothing to do but ſit ſtill upon his Back; becauſe if he doth but ſit faſt, and keep in Action, they look after no more, not heeding whether he guides the *Horſe*, or the *Horſe* him. But let an ill Horſeman be upon never ſo good a *Horſe* and never ſo well managed, if he Rides before a good *Judge*, or Fights with a good *Horeſman*, his weakneſs will certainly appear. Let him therefore that begins to Learn, make it his firſt buſineſs to get a good Seat, a true and exact poſture, without ſtifneſs, or affectation, to gain which, let him add his own obſervation to his Maſters directions, and making choiſe of ſome well ſhaped Perſon (who is known to be a fine *Horſeman*) let him obſerve his *poſture* and *motions*, endeavouring to imitate them, for we are apt to learn faſter from Examples before our eyes, than from the beſt directions that can be given.

In the next place let him endeavour to get a juſt hand upon a *Horſe*, and to give his *Aids* true, and *à propos*, which muſt be done by a conſtant application, and a good Memory; and by working with his *Head*, as well as his *Body*. And laſtly, I would adviſe him to ſtick to it till he is ſo far Maſter of a Horſe, that he is not only able to Ride one that is Managed to his hand, but to teach a young *Horſe* himſelf. For though the teaching a young Horſe be too great a drudgery for

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for a Person of Quality, so that it is not fit he should practice it, yet unless he knows what belongs to it, he will not be capable of Judging when his *Riders* commit Errors, and whether his *Horses* be well Managed or no. And when he leaves the *Academy*, let him be sure to be easie, and unaffected on Horseback, with a loose and manly Gayety, free from scrued *Grimances*, and stiff Postures. For some young Sparks upon their first leaving an *Academy*, have their heads so turned with it, that they are for Managing all Flesh alive, even to the *Post-horse*, and are in the same Postures a *Hunting*, *Hawking*, and the like, that they ought to be in at the head of a *Squadron*; whereas a compleat *Horseman* distinguishes always what *Horse* he is upon, and what he is doing; If he is upon a *War-horse* going to charge, he puts himself in a firm posture, and considers how he shall *Attack*, or *defend*; If a *Hunting*, his *Stirrups* are shortned for the ease of his *Horse*, and his posture is more negligent and loose: If for *Riding* a *Course*, or *Heats*, his Feet are home in the *Stirrups*, his *Elbows* close to his Body, lying snug upon his *Horse*, that he may have the advantage of the Counterpoise, which doth not hinder the Runing so much before: In a word, a good *Horseman* knows how to make use of all *Horses* for all uses, and in all places.

I shall not trouble you with a Journal of *Lessons* for *Managing Horses*, for if you are an Artist it is needless, if not, you must know (what ever some Men have pretended) ti's a thing not to be got by Book, as a Lesson of *Musick* is: I will only tell you one thing and so conclude this *Chapter*, and that is, never to put a young Horse to the *Manege*, that is not naturally made and disposed for it. He must be of a good kind, strong and vigorous, and yet light and nimble, with good *Reins* and *Limbs*, his *Neck* and *Crest* must be well formed, and his *Head* well set on, &c. (according to the former directions, *Chap.* 7.) he must naturally have good motions which you may guess at, by seeing him *Walk* and *Trot*, and striking him gently to see how he presents himself; and he must also be of a good temper: without these qualities the best *Rider* throws away his pains, and the owner his Money. For some Horses are so awkward, stubborn and dogged, having such skittish, resty and Cross-grained Tricks, that tis as easie to teach a *Dromedary* to fetch and carry, as to make them fit for any Action, or service in the War. Therefore when you have a good *Horse*, prize him, for they are very rare, though of so much use and consequence: And if you have two or three particular *Horses* that you would choose in an occasion to venture your life upon, keep them for their proper business, and put them to nothing unnecessary that will fatigue them, or batter their *Limbs*.

CHAP. X.

Of Hunting, or Hunting Horses.

Hunting is (or at least ought to be) a pleasing and profitable Exercise, intended to make us strong and active, and to recreate and delight the Mind: therefore a *Horsman* that is of a warlike nature, ought to choose such sorts of *Hunting* as are most capable to answer those ends; such as hunting the *Stag*, *Buck*, *Fox*, and the like, and in other *Countries* that of the *Wild-Boar* and *Wolf*. And as on the one side, I would not recommend to him deep mouthed *Hounds*, that sort of hunting being too lazy an Exercise for one that would keep himself in vigour; so on the other side, I would not advise him to such very *fleet* ones as some of the Northern, tl at the following them is more properly called *runing* than *hunting*; and my Reason is, because to follow those extraordinary fleet ones, a Man must have such light *Horses*, and keep them so finely and nicely, that they are not fit for any other Service; not that I would have them put to any other, but when occasion requires: As if a Man were to go to the *Army* on a suddain, if his *Hunters* be a good strong sort of *Horses*, with firm *Limbs*, and not too tenderly kept, what a great convenience it is to him, I leave to any one to judge.

I shall not trouble you with any other directions for the choosing a *Hunting Horse*, than to be sure that he has good *wind* and *speed*, that he is naturally of a healthful and hardy Constitution, and withal that he has so much strength (that as I said before) you may, if you have a mind to it, make use of him at the Army for marching, and the like; and above all, keep him not too tenderly, lest when you take him from *hunting* for another use, you find his Body not hardy enough to suffer a new method of keeping.

Some of our well-bred Twelve-stone *Horses*, that have been sent abroad, have proved extraordinary good for the *War*.

It is very requisite to make a *Hunting Horse* acquainted with a *Bit*, and to teach him a little to stop and turn, which not only hinders him from galloping upon his *shoulders*, and makes him surer footed than otherwise perhaps he would be, but renders him more capable of being fitted for the *War* when ever you have a mind to it.

I need not say much in telling you how to ride a *Hunting Horse*, the great *Saddle* being the ground of all; in short, you must *mount* him as directed in the former *Chapter*, and sit in the same posture, only make your *Stirrups* shorter, and let your *Legs* fall nearer the *Horses* sides. In *galloping* lean forwards to ease him, and if you have a *Snaffle Bridle*, in hard riding, lay your right hand upon the Rein of the same side, the better to feel your *Horse*, and because sometimes you can't turn him with one hand.

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In other *Countries* they *hunt* in light *Bits*, and though a *Snaffle* be very pleasant and easie, yet I am of the Opinion that a *Bit* is much more advantageous, in that it makes the *Horse* have a better *mouth*, and the *Rider* a better *hand*.

I would not have any thing in this Chapter offend such Persons as are wholly Strangers to *Military Affairs*, and not at all inclined that way, keeping their *Horses* only for pleasure and ordinary business, they may (if they please) go on still in their own Road; what I have said will be no inconvenience to them, and may be of service to such as love the *War*, and warlike Exercises.

CHAP. XI.

Of the Race, or Race-Horses.

IF you would have good *Runing Horses*, they should be thus shaped; let them be as light as possible, large and long, but well shaped, with a short back, long sides, and a little long legged, and narrow breasted, for such will gallop the lighter and nimbler, and run the faster.

The excellent Breeds of *Runing Horses* that we have in *England*, though (through the several Abuses which have been made) they have been unfortunately mischievous to a great many Persons, yet if rightly regulated, and made use of, might be very advantageous to the Kingdom, as well as pleasant and diverting to Men of Quality.

The advantage is this; by having *Plates* run for at several times, and in several Counties, we come to know exactly the *Speed*, *Wind*, *Force*, and *Heart* of every *Horse* that runs, which directs us infallibly in our choise when we have a mind to furnish our selves for the *War*, *Hunting*, *Breeding*, the *Road*, and the like; whereas if we could see no such Trial made, we must stand more to our hazards, and should not be so sure to meet with good ones: For a *Horse* may *travel* well, *hunt* well, and the like, and yet when he comes to be pent hard, and forc'd to the top and extremity of what he can do, may prove not good at heart; and what Person of Quality is not glad to *breed* or *buy* the best? The same failure in Nature which makes a *Horse* faint-hearted when he is strained to his utmost, and kept to it, will make him so if he is desperately wounded: For some *Runing Horses* that have wanted neither *wind* nor *speed*, have been beaten only by their Hearts sinking in them when they come to be hard prest.

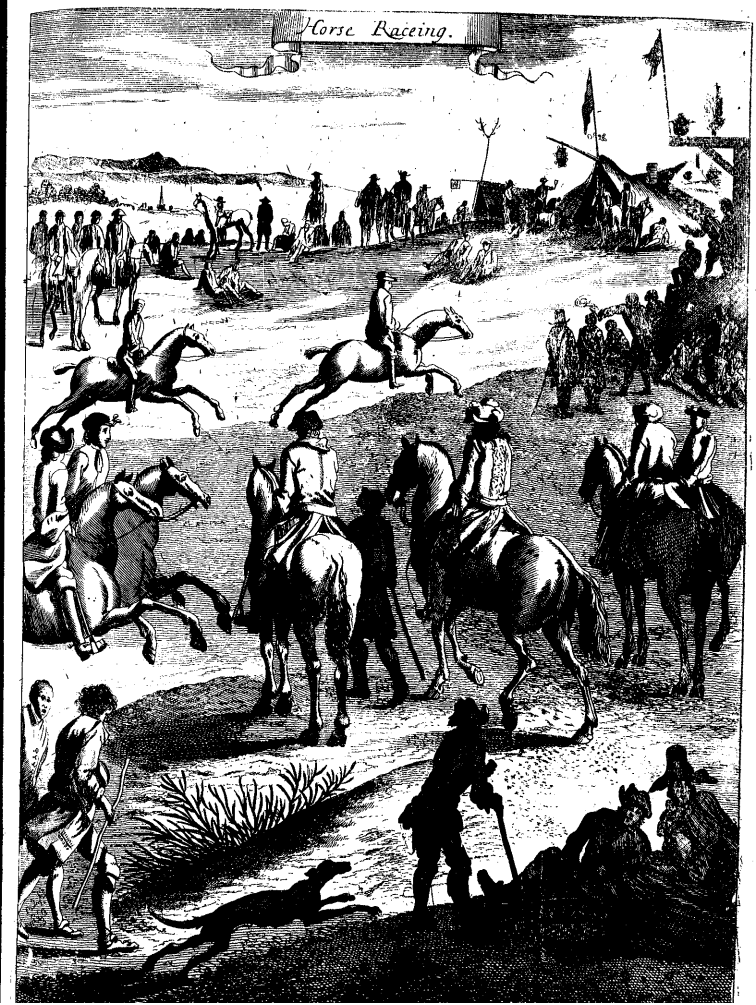
As for the regulating this matter, I could wish that our *Nobility* and *Gentry* would not make a *trade* of *Racing* so much as some have done, it draws one into vast Expences by way of preparation for a Revenge; and then if a second ill Fortune comes, I need not relate the unhappy consequence; but if one proves successful, he is apt to fancy he shall prove so again, and so before he thinks on't, he is declared a *Jocky*, sets up for a Brother of the *Spur*, and runs so fast, that sometimes neither his *Estate* nor *Friends* can keep along with him, turning his Diversion into a Misfortune.

I shall speak of the Methods of ordering *Runing Horses*, when I come to the last part of this Discourse, which is of *Keeping*. We will therefore now suppose a *Horse* set to run for a *Plate*, and that the Hour of starting is at hand.

When the *Drum* beats, or the *Trumpet* sound (according to the Custom of the place where you run) to give notice for *stripping* and *weighing*, In the first place be sure to have your Stomach empty, only taking something to keep out the wind, and to strengthen you. If you are so light that you must carry weight, let it be *shot*, equally quilted in your *Waistcoat*; but if you are just weight it is better, for then you have only to dress you according to your own fancy. Your *Cloaths* should be of coloured *Silk*, or of white *Holland*, as being very advantageous to the Spectators. Your *Waistcoat* and *Drawers* must be made close to your Body, and on your *Head* a little Cap tied on: Let your *Boots* be gartered up fast, and your *Spurs* must be of good *Mettal*.

Thus equipped, you are to mount, and come to the place of Starting, where going off briskly or gently, as occasion requires, make your *Horse* perform the *Course* or *Heat* according to your design intended. For Example: If you would win the same, and your *Horse* excells in goodness more than speed, start him off roundly, and run him to the very top of what he can do during the whole *Course* or *Heat*, and by that means, if the *Horse* you run against be not so good at *bottom*, though he has more *speed*, you shall beat him, because he will be run off of it a great way before he comes to the end: But on the contrary, if your *Horses* Talent be *speed*, all that you can do is to wait upon the other *Horse*, and keep behind him till you come almost to the Stand, and then endeavour to give a Loose by him. Sometimes when you are to run more *Heats* than one, it will be your Policy to lose a *Heat*; and in such a case, for the easing and safeguard of your *Horse*, you must lye behind all the way, as much as you can, provided you bring him in within distance.

As for your Posture, place your self upon your *Twist* with your *Knees* firm, and your *Stirrups* just at such a length, that when your Feet are thrust home in them, you can raise your self a little in the *Saddle*; for without that allowance your *Face* will not be free when you come to run



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As for the regulating this matter, I could wish that our *Nobility* and *Gentry* would not make a *trade* of *Racing* so much as some have done. When they run only for *Plates*, or their *Matches* are for no more than may be lost without damage to their Estates, 'tis very innocent diversion; but to run for so great a Sum that the loss can't be well born, and consequently one must endeavour to win the same (if not more) back again, it draws one into vast Expences by way of preparation for a Revenge; and then if a second ill Fortune comes, I need not relate the unhappy consequence; but if one proves successful, he is apt to fancy he shall prove so again, and so before he thinks on't, he is declared a *Jocky*, sets up for a Brother of the *Spur*, and runs so fast, that sometimes neither his *Estate* nor *Friends* can keep along with him, turning his Diversion into a Misfortune.

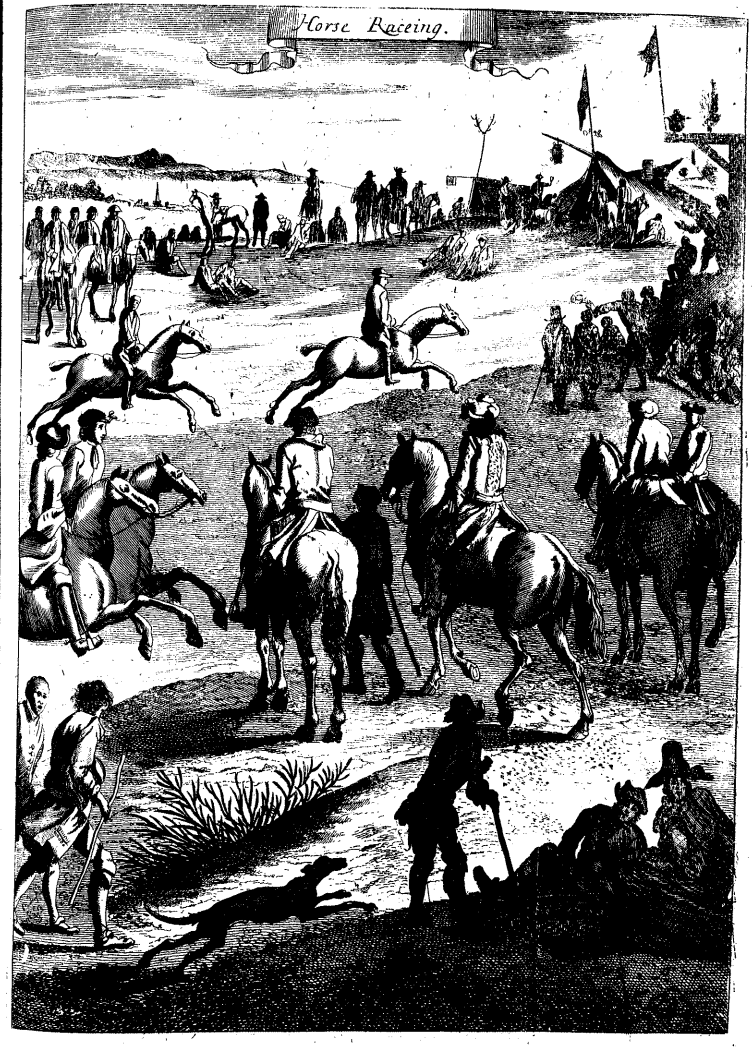
I shall speak of the Methods of ordering *Runing Horses*, when I come to the last part of this Discourse, which is of *Keeping*. We will therefore now suppose a *Horse* set to run for a *Plate*, and that the Hour of starting is at hand.

When the *Drum* beats, or the *Trumpet* sound (according to the Custom of the place where you run) to give notice for *stripping* and *weighing*, in the first place be sure to have your Stomach empty, only taking something to keep out the wind, and to strengthen you. If you are so light that you must carry weight, let it be *shot*, equally quilted in your *Waistcoat*; but if you are just weight it is better, for then you have only to dress you according to your own fancy. Your *Cloaths* should be of coloured *Silk*, or of white *Holland*, as being very advantageous to the Spectators. Your *Waistcoat* and *Drawers* must be made close to your Body, and on your *Head* a little Cap tied on: Let your *Boots* be gartered up fast, and your *Spurs* must be of good *Metal*.

Thus equipped, you are to mount, and come to the place of Starting, where going off briskly or gently, as occasion requires, make your *Horse* perform the *Course* or *Heat* according to your design intended. For Example: If you would win the same, and your *Horse* excells in goodness more than speed, start him off roundly, and run him to the very top of what he can do during the whole *Course* or *Heat*, and by that means, if the *Horse* you run against be not so good at *bottom*, though he has more *speed*, you shall beat him, because he will be run off of it a great way before he comes to the end: But on the contrary, if your *Horses* Talent be *speed*, all that you can do is to wait upon the other *Horse*, and keep behind him till you come almost to the Stand, and then endeavour to give a Loose by him. Sometimes when you are to run more *Heats* than one, it will be your Policy to lose a *Heat*; and in such a case, for the easing and safeguard of your *Horse*, you must lye behind all the way, as much as you can, provided you bring him in within distance.

As for your Posture, place your self upon your *Twist* with your *Knees* firm, and your *Stirrups* just at such a length, that when your Feet are thrust home in them, you can raise your self a little in the *Saddle*; for without that allowance your *Legs* will not be firm when you come to *run*: The counterpoise of your Body must be forwards to facilitate your *Horses runing*, and your *Elbows* must be close to your Body; but above all, be sure not to incommode your *Horse* by swagging this way or that way, as some do; for since Weight is a great matter in *runing*, and a trouble some

Rider



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Rider is as bad as ſo much more weight. I need not tell you how neceſſary it is to take great care of your *ſeat* and *hand*; you muſt therefore beware of holding your ſelf by the *Bridle*, or of jobbing your *Horſes mouth* upon any occaſion; you muſt take your right *Rein* in the ſame hand, holding up your *Horſe*, &c. as you find it neceſſary, and every now and then remove the *Bridle* in his *mouth*. But theſe things are learn't better by Experience and Practice than by Book.

When a *Plate* is run for by *Heats*, every Man that rides muſt weigh juſt at Starting in great *Scales* brought into the Field for that purpoſe, and at the end of the ſame *Heat*: For if you want of your weight at coming in, you ſhall loſe your *Heat*, although you are the firſt *Horſe*. Between the firſt and ſecond *Heat*, you have half an hour to rub your *Horſes*, and then the *Drum* or *Trumpet* giving warning again, you mount, &c. as before, and ſo till you have finiſhed all, which is ſometimes three *Heats*, and ſometimes three *Heats* and a *Courſe*, according to the cuſtom of the place.

I forbear ſaying any thing of the ſeveral Ceremonies relating to the *Judges*, and the *Articles* by which *Plate Races* and *Matches* are regulated, becauſe beſides that 'tis very eaſie to inform ones ſelf of them at a Minutes warning; they are more or leſs, according to the different Cuſtoms of the place where you *run*.

When you keep *runing Horſes*, which I would adviſe you to do only for *Plates*, and *Matches* of Sport and good Fellowſhip, and not for large Sums, if you do not breed them your ſelf, be ſure to buy no *Horſe* that has not extraordinary good Blood in his Veins: For a *Runing Horſe* coſts a great deal of Mony to keep, and a good one eats no more than a bad one, nor requires more attendance. Some men to ſave Twenty or Thirty *Guinea's* in the Price of a young *Horſe*, have loſt Hundreds by him afterwards.

A *Horſe* that you have tried once or twice at a *Twelve-ſtone Plate*, you may be ſure to make an extraordinary Hunter of; or if he be well turn'd, and diſpos'd for it, a *War-horſe*: In ſuch a Caſe a Man has a great deal of Satisfaction, becauſe he knows what his *Horſe* is, and what he can do.

Note, That the Poſture, Manner of Riding, &c. is the ſame in a *Match* as in a *Plate-Race*, only that there being but a ſingle *Courſe* to be run, you muſt puſh for all at that one time; whereas when there are ſeveral *Heats*, there is more ſaving, and variety of play.

CHAP. XII.

Of the Pad.

A *Pad* ought to be ſtrong, light and nimble, which you will ſay are Qualities not eaſie to be found together in one *Horſe*: I own it; and therefore am of Opinion that no *Horſe* is harder to find than a true, right *Pad*, eſpecially if we conſider, that to deſerve that Name, his *Goings* muſt be likewiſe true, as well as graceful and eaſie. If you are a *Breeder*, I refer you to my Directions *Chap.* VII. where I diſcourſe about *breeding Pads* as well as other *Horſes*: But if you muſt buy, take in ſhort theſe following Directions, which may be ſome help to you in chooſing your *Pads*, and indeed almoſt all other *Horſes*.

The Marks of a good Horſe.

THe Marks of Beauty and Goodneſs in a *Horſe* are theſe; his *Ears* ſhould be ſmall, thin and ſharp, carrying them well; or if they be long, but well ſet on, upright and moving, it is not amiſs. His *Face* ſhould be lean and bony, his *Forehead* ſwelling outwards, and the *Feather* of his Face ſet pretty high, that is, above his Eyes, or at the top of them; and if he is mark'd with white (provided it is not too much) upon his *Face*, or the ſnip of his *Noſe*, ſo much the better. His *Eyes* ſhould be round, black and ſhining, ſtanding out from his Head: His *Cheek-bones* or *Chaps*, ſhould be lean and thin, with the ſpace between them wide, and free from *knots* or *kernels*; and his *Wind-pipe* large. His *Noſtrils* ſhould be dry and wide, ſo that upon the leaſt ſtraining a fiery redneſs is ſeen in them. His *Muzzle* ſhould be ſmall, his *Mouth* deep, and his *Lips* ſhould ſhut tite and well, the Upper being about an Inch longer than the Lower. The next thing to be obſerved is his *Teeth*, by which (now it falls in our way) I ſhall give you direction to know a Horſes Age.

To know the Age of a Horſe.

YOu muſt remember that a *Horſe*, when he has all his *Teeth*, hath juſt Forty; that is, Four and twenty Grinders, Twelve on each ſide, Six above, and Six below, on the ſame ſide; then Twelve *Gatherers*, Six above and Six below, on the fore part of his Mouth, which makes Six and Thirty; and laſtly four *Tuſhes*, one above and one below on each ſide, which makes up the Forty. The firſt year he has his *Foals Teeth*, which are only *Grinders* and *Gatherers*, without any *Tuſhes*; they are ſmall and white. The ſecond year the four foremoſt *Teeth* will appear browner and bigger than the reſt. The third year he changes the next to them, and leaves no *Foals Teeth* before, but Two upon each ſide above, and the ſame below. The fourth year he changes the next to them, and leaves but one upon each ſide above, and the ſame below. The fifth year his foremoſt *Teeth* are all changed, his *Tuſhes* being compleat on each ſide, and the *Teeth* that came in the room of the laſt *Foals Teeth* which he caſt, are hollow, having a little black Speck in the middle, which is called the *Mark* in a *Horſes Mouth*, and ſo continues till the eighth year, or thereabouts. The ſixth year he has new *Tuſhes*, about the bottom of which you may ſee a little Circle of new Fleſh, and the *Tuſhes* will be *white*, *ſmall*, and *ſharp*. The ſeventh year

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year all his *Teeth* are grown to perfection, and the Mark in his *Mouth* (as we call it) is very plain to be seen. The Eighth year all his *Teeth* are full and smooth, the Mark being scarce visible, and his *Tushes* grow yellower. The Ninth year his foremost *Teeth* shew *longer*, *yellower* and *fouler* than before, and his *Tushes* grow blunt. I will go no farther, because I would not advise you to meddle with old *Horses*. But to return to our business in hand.

The Shape of a Fine Horse.

From his *Head* look down to the *Breast*, which should be broad and beautified with *Feathers*. His *Fore-Thighs* to the *Knees* should be firm and sinewy without any swelling, and his *Knees* should be close knit, carrying an equal proportion. From the *Knees* to the *Pasterns* his *Legs* should be clean and nervous, and the Inside of his *Knees* should be free from any *Seam*, *Scar* or *Scab*. His *Pasterns* should be well knit, and not too long, and he should tread right upon them. His *Hoofs* should be *black*, *smooth*, *tough* and *hollow*, and rather a little long than round. For the Shape of his *Neck* and *Crest*, and the setting on of his *Head*, I refer you to *Chap.* VII. The *Chine* of his *Back* should be *broad*, *even* and *strait*; his *Ribs* round in compass and bending outwards, and his *Fillets* strong and short. He should be *Home-ribb'd*, and his *Body* should be well let down. His *Buttocks* should be round, full and plump, lying in a level with the rest of his *Body*. His *Gascoyns* should be full and brawny, being well let down as far as the Middle-Joynt, which should be nothing but *Skin*, *Bones*, *Veins* and *Sinews*; and his *Hind-Legs* clean and sinewy. These are generally marks of *Beauty* and *Goodness*, and the more a *Horse* has of them the better; for I never yet saw a *Horse* compleatly perfect.

To observe these things exactly, you should do well to have the *Horse* you intend to buy, stript naked and led out before you; and when you have viewed him all over, having some able and trusty *Farrier* with you to make enquiry into those hidden *Maladies*, which might escape your own or anothers search, you have only to examine his *Goings*, which must be true and nimble, with case to himself as well as his *Rider*.

But the surest way of Buying is to be acquainted with good *Breeders*, and taking Young *Horses* that are but just Backt, to have them *Man:g'd* and ordered according to your own fancy.

If you have lived altogether in the *Country*, or have never learnt to Ride of a *Master*, nor indeed never design any such thing, as having no inclinations to *Military Affairs* or *Martial Exercises* (as it is not necessary all *Gentlemen* should) however it is very commendable and Gentile to see you get up your *Horse* with a good *Air*, and to sit handsomly; though it be only upon the *Road*, or a *Hunting*, *Hawking*, or the like; and to hold your *Reins* like a *Horsman*, knowing which way to guide, and stop without *Jobbing* and spoiling his Mouth, and making such odious and ridiculous Postures that some are apt to do. To which end you may be pleased to take notice thereof, and to consider what has been said concerning the Art of *Riding*, *Chap.* IX. and endeavour to put so much of it in practice as you shall find suitable to your Inclinations, especially that which relates to *Mounting*, and the true Posture of a good *Horsman*; and if you would have that *Character*, never Ride upon the *Road* in a *Jocky-Cap* or *Snaffle-Bridle*; but with a *Bit* and *Pistols* well adjusted and fitted to your *Pad*.

I speak this to such that are not at leisure, or unwilling to learn in an *Academy*; for though I think it absolutely necessary for those that are *Martially* inclined, and requisite for all the rest of the *Nobility* and *Gentry*, as it is a Manly and Gentile accomplishment to Ride well: Yet it is better to know something, than to be ignorant of all; and for those that will not learn of others, to get what they can of themselves.

If you are a compleat *Horsman*, you will take delight in having your *Pads* stop, and turn readily, and to make them be put a little upon the *Haunch*, which will render them infinitely agreeable.

CHAP. XIII.

Of Horses for the Coach, Wagon, Burthen, &c.

I Need not say much concerning the *Coach*, *Wagon*, *Carriage*, *Burthen*, and the like, it being not quite so difficult to find *Horses* proper for those uses, as for what hath been said in the fore-going *Chapters*.

For your *Coach* in Town *Dutch* or *Flanders* Horses are best (for which see *Chap.* V.) in the choosing of which observe that they be well quartered and short *Backt*; that they have strait and sound *Limbs*; that they *Trot* well and nimbly; that their *Eyes* be good, and that they carry good *Bodies*; not but that I would have you examine them at large, according to all the Rules of *Beauty* and *Goodness*: But because the contraries to what I here particularly name are the most frequent and usual faults in these kind of *Horses*.

In the *Country*, or for Travelling, our *English Horses* are the best, if well chosen; for their size the best is about Fifteen Hands and an half high, and they must be Squat and well Trust, with sound *Legs* and *Feet*, &c. In observing their *Trot*, take notice if they lift up their *Feet* nimbly and evenly, and keep their middle *Joynts* behind wide asunder, 'tis very good.

For *Carriages*, *Wagons*, *Servants*, and all sort of *Drudgery*, you have nothing to do, but to make choice of plain and strong *Horses* that are in health and vigour, and withal free from *Maladies*, their business being nothing but Servile labour; only be sure that your *Baggage Horses* above all have short and strong *Backs*, and be of a pretty large size.

CHAP. XIV.

Of Riders, Keepers, Grooms, &c.

The Business of a *Rider* being to *Back*, *Mouth* and *Manege* young *Horses*, he ought to be very skilful and adroit, bold and firm on Horse-back, with a just and even hand, being exactly perfect in all the *Lessons*, *Aids*, and the like, that are to be taught a *Horse*, either for the *War*, *Pleasure*, &c. He ought to suit to every *Horse* such a *Bridle* and *Saddle* as is fittest for him. He should be a Man of Temper and Judgment, never beating a young *Horse*, but when he is forced to it, and this with discretion, endeavouring if possible to win him by sweetness and good usage; and withal this, He should be sober and diligent, for without that he will not be able; and unless he is diligent, he will be unwilling to perform his Duty with that exactness which is requisite in such an Employment.

By *Keepers*, I mean such as have the keeping *Ruining Horses*; and that you may the better know their business, I will give you the Method of a *Ruining Stable*. You must have for every *Ruining Horse*, a little Boy to Ride him his *Airings*, *Water-Courses*, and the like: And over all these a *Keeper*, who orders and overlooks the whole business of *Dyeting* and *Exercising*; for which end he must understand all that which belongs to the keeping of a *Ruining Horse*. See *Chap.* XIX.

A *Groom* should be sturdy, healthful and strong; His business is to understand the ordinary ways of Keeping all sorts of *Horses*; that is, for the *War*, *Pleasure*, *Travel*, and the like. And above all, he ought to be free from *Drinking*; for the best *Groom* in the World, when he is *Drunk*, is in danger of spoiling his *Horse* by *Heats*, *Colds*, and their giddy brain'd Extravagancies.

In general; As for all sorts of *Servants* in and about your *Stables*, be sure that they understand their respective places, and deport themselves well therein; for good *Servants* (well ordered) conduce very much to the preservation of your *Horses*, and have always a good Equipage.

CHAP. XV.

Of Keeeping, Dyeting and Ordering the Ruining Horse.

In the keeping of *Ruining Horses*, unless a Man has Experience and Practice, the best Rules imaginable are insufficient; but because it is impossible to set up without a Fond, and build without a Foundation, I shall give you some Directions, leaving you still the liberty to vary or add according to your own Observation, as occasion requires.

There are Three States of Body in which a *Horse* may be.

1. Fat and Foul.
2. Lean and Poor.
3. In a moderate State between both.

Now you must be sure to proportion and order the *Dyet* and *Exercise* of your *Horse* suitable to the state and condition he is in. You must also (for the same end) have a special regard to the particular Nature and Constitution of every *Horse*: But your own Remarks (upon due Practice) and common Reason will direct you sufficiently in these Points. For is it not very reasonable to take more time to bring a Foul *Horse* to sharp *Exercise*, than one that is already in a pretty tolerable condition; and that a *Horse* of a spending nature ought not to have so violent Exercise, as one of a harder temperament? I will therefore pitch upon a Fat *Horse*, that being the difficultest of the Three, and examine how to bring him into such a good order, that he shall perform his Course to the best advantage; and by discoursing of this, you will know how to deal with the other two.

If therefore you match a *Horse* that is fat and foul, either by runing at *Grass*, or standing at *Soil*, by too high keeping, or by any other means of rest, for the first fifteen days at least, rise by day-break, and having put on his *Bridle* washt in *Beer*, and tyed to the Rack cleans the *Stable* from the Dung, and then dress him very well; that is to say, first *Curry* him all over from the *Head* to the *Tail*, from the top of his *Shoulder* to his *Knee*; and from the top of his *Buttock* to his hinder *Gambril*; then dust him all over with a *Horses Tail*, or a clean dusting-cloath, then curry, or rub him all over with the *French Brush*, beginning at his *forehead*, *Temples* and *Cheeks*, so down his *Neck*, *Shoulders* and *Fore-legs* to his *Hoofs*, then along his *Sides*, and under his *Belly*, and lastly his *Buttocks*, and *Hinder-legs*; then rub him all over with your wet hand, not leaving as near as you can one loose *Hair* about him, nor one wet *Hair*, because you must keep rubing him until he is rub'd dry with your hands. Then with your wet hand cleang his *Sheath*, his *Tard*, his *Stones* and his *Tuel*, and indeed you must not leave any secret place uncleansed, as his *Ears*, *Nostrils*, *Fore-Bowels*, and between his hinder *Thighs*. This done, take a *Hair-cloth* and rub him all over, but especially his Face,

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Eyes, Cheeks, between his Chops, the Nape of his Neck, and down his Legs, Fetlocks, and about his Pasterns. Having done all this, rub him all over with a clean *Woollen-cloth*, beginning at his *Head*, and so to every part of his Body as before directed; then take a wet *Main-comb* to comb his *Main* and *Tail*; when you have thus dreſt him, put over him his *Body-cloth*, which muſt be thicker for the Winter Seaſon than for the Summer, for which fine *Cotton* is moſt fit; then put on his *Saddle*, girting the foremoſt Girt pretty ſtrait, and the other a little ſlack, and wiſp it on each ſide of the Horſes *Heart*, that both the Girts may be of equal ſtraitneſs; then put on a warm *Breaſt-cloth*, which may cover both his *Shoulders*.

When the *Horſe* is thus dreſt, and made ready, take a little Beer in your Mouth, and Squirt it in his, and ſo lead him out of the *Stable* and mount him, leaving ſome of the Helpers to cleang the Stable, and ſhake up the *Litter*, for before that your *Horſe* ſtands upon a good ſtore of freſh dry *Litter* both night and day, which *Litter* ſhould be *Wheat-ſtraw*, if poſſible, or for want uſe *Oat-ſtraw*, but *Barly* and *Rye-ſtraw* are eſteemed unwholſom, the one cauſing heart-burning, and the other ſcouring.

When you are thus mounted, walk forth your *Horſe* a foot-pace (which is called *Rakeing*) for about two miles upon ſound and ſmooth ground, and if you can, upon hilly places, where gallop him gently, but rack, or walk him down gently that he may cool as much as you heated him, and by this time the *Sun* will be riſen, ſo that you may walk him to ſome *River* or clean Pond, and permit him to drink his fill; then *Gallop* and *Exerciſe* him moderately as before, and having walked him a pretty ſpace, offer him more Water; if he *drink*, then *Gallop* him again, but if he refuſeth *Gallop* him to occaſion thirſt, and always exerciſe him before and after drinking. And when he hath ſufficiently drunk, bring him gently home without a wet *Hair*; when you are come to the *Stable Door* alight, (his Litter being prepared for him) and by whiſtling, ſtretching the *Horſe* upon the *Straw*, and raiſing the Straw up under him, ſee if you can cauſe him to *Piſs*, which if at firſt he doth not, yet by accuſtoming him to it, he will ſoon be brought thereunto, for it is not only wholſom for him, but cleanly for the keeping the *Stable*.

Theſe things being performed bring him into his Stall, and firſt tye his Head up to the *Rack* in his *Bridle*, then with hard *Wiſps* rub down his *Fore-legs* as hard as you can, then unlooſe his *Breaſt-cloth*, and rub his *Head*, *Neck*, and *Breaſt* very well with a dry *Cloth*, then take off his *Saddle* and *Body-cloth*, rubing his Body very well, eſpecially his *Back* where the *Saddle* was, and ſo clothe him up with a *Linen-ſheet*, over which caſt a good ſtrong *Houſing-cloth*, and over that his *Woollen Body-cloth*, which in the Winter may be lined with thin *Cotton*; then girt theſe *Cloths* on with his Surſingle, which ſtuff round, with reaſonable big, and ſoft *Wiſps*, which is more eaſie for him to lye down with, than with thoſe ſmall hard *Wiſps*.

After he is thus *Clothed* up, pick his *Feet*, and ſtop them up with *Cow-dung*; then caſt into his *Rack* a little bundle of *Hay* well duſted, and hard bound up, for him to tear out as he is bridled up, and having ſo ſtood about an hour and a half come to him, and firſt rub his *Head*, *Face*, and the Nape of his *Neck*, with a clean Rubber made of new rough *Hempen-cloth*, which is excellent for his *Head*, diſſolving all groſs and filthy humours, then draw his *Bridle*, and with a clean Cloth make the Manger ſo clean as poſſible, taking away all the ſcattered *Hay*, and caſt it into the *Rack*; then take about a Quart of ſweet, dry, old, and clean *Oats*, the whiteſt, and heavieſt being the beſt, for thoſe that are muſty breed infirmities, the Moiſt cauſeth ſwelling in the Body, the New breeds *Worms* and pain in the Belly, and thoſe half-dreſt deceive the ſtomach, and ſpoileth the *Horſe*. The *Black Oats* are not ſo good as the White, becauſe they make foul Dung, ſo that one can't ſo well know the State of his Body.

This Quart of *Oats* put into a *Sieve* that is ſomewhat leſs than a *Riddle*, and bigger than a *Reeing-ſieve*, which will let the light *Oats* go through, but keep in the full plump ones: In this *Sieve* ree, dreſs, and toſs them very well, that there is no duſt or foul thing therein, and ſo give them your *Horſe*, and if he eats them with a good *Stomach*, you may give him as much more ſo ordered; and ſo let him reſt till about eleven of the Clock, and then viſit him again, and having rub'd his Neck, Head and Face, give him about the ſame quantity of *Oats* ſo dreſt and ordered as aforeſaid; then ſhutting up the light that he may be in darkneſs, leave him till about one of the Clock: For the darker you keep him in your abſence, the better it will occaſion him to feed, and to lye down and take his reſt; and therefore it is cuſtomary to arm the Stalls where the Horſes ſtand, round about, and over the Rack with ſtrong *Canvaſs*, as well for darkneſs as for warmth.

About one of the *Clock* give him the like quantity of *Oats* dreſt as aforeſaid, and after you have rub'd his *Face*, *Head*, the Nape of the *Neck*, and cleanged the Stable from the Dung, give him a little Knob of Hay, and ſo leave him till about four a Clock, if in the *Summer*, and three if in the *Winter*; then come again, cleang the Stable, and *Bridle* him up, having wet the Snaffle with *Beer*, and tyed him up to the *Rack*, then take off his *Clothes* and dreſs him in all points as before directed for the Morning, then Clothe and Saddle him as aforeſaid, and bring him forth, uſing what means you can to make him piſs and dung at the *Stable* door upon the foul Litter; then mount and ride him forth as in the Morning, but not to the *Hills*, chooſing plain grounds near ſome *River*, and ſo give him his *Airing*, *Galloping* him before and after his Water, then rakeing him gently up and down. In your rakeing you muſt obſerve in all your paſſages (eſpecially when you would have him empty himſelf) to let him ſmell upon all the old and new Dung you meet with, which will make him empty his Body, and repair his Stomach

After

After you have watered him, and ſpent the Evening in *Airing* him (for nothing is more wholeſom, or ſooner conſumeth foulneſs than early or late *Airing*) ride him home, and obſerve to do all that you did to him in the Morning as well within doors as without, and ſo leave him on his *Bridle* for above an hour; then go to him, rub him well, draw his *Bridle*, cleang his Manger, put up his ſcattered Hay, give him about a Quart of Oats well dreſt and ſifted, and ſo leave him till about Nine a Clock, then viſit him again, firſt rubing down his Legs with hard *Wiſps*, then with a clean Cloth rub his *Face*, *Head*, *Neck*, and foreparts, then turn up his *Cloths*, rub his *Buttocks*, *Fillets*, and hinder parts, which done, put down his *Clothes*, give him another Quart of *Oats*, and put into his Rack a little bundle of Hay as before directed, then toſs up his *Litter* to make his Bed ſoft, and ſo leave him till the next Morning, and then come to him early as before directed, and do every thing as you did before. And thus keep him for the firſt Fortnight; in which by this double dayly exerciſe his Fleſh will be ſo hard, and his foulneſs ſo conſumed, that the next Fortnight (if you be a temperate Man) you may venture to give him gentle *Heats*.

As concerning his *Heats* obſerve theſe directions, Firſt that two *Heats* in a week is enough for any Horſe of what ſtate of Body ſoever. Secondly, that one Heat ſhould be given upon that day in the Week, on which he is to be run his *Match*, as for Example; If your *Match* is to be run upon a *Munday*, then your fitteſt heating days are *Mondays*, and *Frydays*, and the *Monday*, to be always the ſharper *Heat*, becauſe it is the day of the *Match*, and there is three days reſpite betwixt it and the other Heat: If the *Match* day be on a *Tueſday*, then the Heating days are *Tueſdays* and *Saturdays*: If on *Wedneſdays*, then the *Heating* days are *Wedneſdays* and *Saturdays*; and if on *Thurſdays*, then the *Heating days* are *Thurſdays* and *Mundays*, and ſo of the reſt. Thirdly, give no Heat (except in caſe of extremity) in rainy or foul weather, but rather diſſer *Hours* and change *Times*, for it is unwholſom and dangerous; therefore in caſe of ſhours and uncertain weather be ſure to provide for him a warm lined Hood with linen *Ears*, and the Nape of the Neck lined to keep out Rain, nothing being more dangerous than for cold wet to fall upon his Ears, the Nape of his Neck, and his *Fillets*. Fourthly, give your Heats (provided the Weather be ſeaſonable) as early in the Morning as poſſible, that is, by day-break.

As to your ſecond Fortnights keeping, obſerve all things, as before directed for the firſt Fortnight, only before you put on his *Bridle*, give him about a Quart of Oats clean ſifted, which as ſoon as he has eaten, bridle him up, and dreſs him in all particulars as in the firſt Fortnight, alſo *Clothe*, *Saddle*, *Air*, *Water*, and bring him home in all points as in the firſt Fortnight, only put no Hay in his Rack to tear out, but only draw with your hand as much fine ſweet Hay well duſted as you can well gripe, and let him as he ſtands on the *Bridle* tear it out of your hand, which if he doth greedily, then give him another, and another, and ſo let him ſtand on the *Bridle* about an hour, then come to him, and after rubing, and other ceremonies performed as aforeſaid, ſift and dreſs about a Quart of *Oats*, and ſet them by; then take a Loaf of Bread that is three days or more old made after this manner.

Take three Pecks of clean *Beans*, and one of good *Wheat*, mix them together, and grind them to fine *Meal*, then ſift it through a fine *Seive*, and knead it with a little Water, and a good quantity of Yeſt to make it light, and ſo let it lye for ſome ſpace to make it light before you make it up into Loaves, which muſt be well baked.

At three days old you may give your Horſe ſome of it, but not ſooner, new Bread being dangerous, occaſioning Surfeits; but if you are conſtrained to give it ſooner, or that it is then damp or clammy, then cut it into thin *Slices* and lay it to dry, and ſo crumble it amongſt his *Oats*.

But to return to our former diſcourſe. This *Bread* of three days old chip very well, and cut into thin ſlices (as much as may countervail the quantity of *Oats*) very ſmall, and mixt with the *Oats*, and ſo give them your *Horſe*.

About Eleven a Clock viſit your Horſe, and having performed your By-ceremonies before treated of, give him the ſame quantity of *Bread* and *Oats* as you did in the Morning, and ſo let him reſt till the Afternoon; and about one of the Clock, or after, if you intend to give him an *Heat* the next day, feed him with *Bread* and *Oats*, as you did in the Forenoon, and ſo conſequently every Meal following for that day, obſerving every thing as before directed you.

But if you intend the next day to give him an *Heat*, then only give him a Quart of good clean ſweet *Oats*, and as ſoon as he has eaten them, put on his *Bridle*, and tye him up, not forgetting all the aforeſaid Ceremonies; then *Dreſs* him, *Clothe* him, *Saddle*, *Air* and *Water* him as before directed; and when you bring him home, order him as before ſhewed, only give him no *Hay*; after he hath ſtood about an hour on the *Bridle*, give him another Quart of clean *Oats*, which when he hath eaten, put on his Head a ſweet clean waſh't *Muzzle*, and ſo let him reſt till about Nine of the Clock at Night.

As concerning the uſe of the *Muzzle*, and which is the beſt, you muſt know that as they are moſt uſeful, being rightly made, ſo they are hurtful if falſly made: The true uſe of them is to keep your *Horſe* from eating up his *Litter*, from gnawing upon *Boards* and *Mud-walls*, and to be ſhort, from eating any thing but what he receives from your hand. Theſe *Muzzles* are ſometimes made of *Leather*, and ſtampt full of Holes, or elſe cloſe, but they are not wholſome; for if it be alom'd *Leather*, the *Alome* is often-five, if liquor'd, the *Greaſe* and *Ouze* are as bad; beſides, they are too cloſe and too hot, occaſioning oft-times ſickneſs in your *Horſe*, and to keep his Dung longer in his Body than otherwiſe he would do.

The beſt *Summer Muzzle* is the *Net-muzzle*, made of ſtrong *Packthread* thick knit, with ſmall Maſhes at the bottom, and waxing wider and

wider

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wider up to the middle of the Horſes head, and bound about the top with ſtrong Tape, having on the near ſide a Loop, and on the far ſide a long String of Tape to be faſtned to the Horſes head.

The beſt *Winter Muzzle* is made of ſtrong double *Canvas*, with a round bottom, and a ſquare *Lettice Window* of ſmall *Tape* before his *Noſtrils*, down to the bottom of the *Muzzle*; and this muſt alſo have a *Loop* and a *String* to faſten it to his *Head* as the other.

At Nine of the Clock at Night viſit your *Horſe* again, and having performed your By-ceremonies as aforeſaid, give him a quart of clean ſifted *Oats*, and as ſoon as he hath eat them, put on his *Muzzle*, toſs up his *Litter*, and leave him for that Night. The next Morning very early go to him, and if he is laid, do not diſturb him, but imploy your time until he riſeth, by ſifting and cleaning a quart of *Oats*, which rub between your hands, and waſh them in a little *Ale* or ſtrong *Beer*, but not too moiſt, and ſo give it him; as ſoon as he has eaten them, bridle him up, hang by his *Muzzle*, unclothe him, and dreſs him as before directed; then put on his *Body-cloth*, his *Breaſt-cloth*, and ſo *Saddle* him; then being ready to go forth, take his *Bridle Rein*, draw it over the top of the Rack, then raiſe up his *Head*; then take a new laid *Egg* waſh't clean, which break in his *Mouth*, and cauſe him to ſwallow it; after which waſh his *Tongue* and *Mouth* with a little *Beer*, and ſo lead him forth, obſerving the former Directions to cauſe him to Piſs or Dung; then mount him, and rake him gently to the Courſe; and every while make him to ſmell upon other *Horſes* Dung, whereby to cauſe him to empty himſelf the better.

When you are come within about a Mile of the *Starting Poſt*, alight and take off his *Body-cloth* and *Breaſt-cloth*, girting on his *Saddle* again; and having ſent away your *Groom* with thoſe Clothes, and the clean dry *Rubbing-clothes*, let him ſtay at the laſt end of the *Race* till you come; then *rake* him gently up to the *Starting Poſt* and beyond; make him ſmell to that *Poſt*, as alſo to the firſt *Poſt*, which is called the *weighing Poſt*, that he may thereby take notice of the beginning and end of his *Courſe*. And there ſtart him roundly at near a three quarter Speed, and according to his ſtrength of Body, Ability, and chearfulneſs of Spirit, run him the whole *Courſe* through, but be ſure to do nothing in extremity, that is, above his Strength or Wind, but when you find him a little yield, give him eaſe, ſo that all he doth may be with Pleaſure to him; for this manner of Training will make him take delight in his Labour, and ſo increaſe it; the contrary will make his Exerciſe irkſome to him.

During the time that you thus *Courſe* him, obſerve upon what Ground he runs beſt, that is, upon the hilly, ſmooth, or rough Ground; and according as you find his Nature, ſo order your *Courſe*.

Having thus courſed the *Courſe* ſtrongly and ſwiftly, and after a little ſlightly *Gallop* him up and down the Field to rake his Wind, and chear his Spirits (your *Groom* being ready with your *Clothes* and other Neceſſaries) Ride to ſome warm place out of the Wind, as under ſome *Tree* or *Hedge*, where alight, and with a *graſing* or *ſcraping Knife*, which is commonly made of ſome broken *Sword Blade* or *Sythe*, or for want thereof of a thin piece of old hard oaken Wood, faſhioned like a broad long *Knife*, with a ſharp *Edge*, and uſing it with both your hands, *ſcrape* off all the ſwet from every part about him; and thus do until you find there is no more ſwet ariſe; and ever and anon move him up and down, and then with dry *Clothes* rub him very well all over; then take off the *Saddle*, and having *ſcraped* and *rub'd* his *Back*, put on his *Body-cloth* and *Breaſt-cloth*, then his *Saddle*, well girted on, then *Gallop* him gently forth, and again a little ſpace after rubbing his Head, Neck, and Body as you ſit on his Back; then walk him about the *Fields* or *Downs* to cool him, and when you find that he dries apace, *rake* him gently homewards, ſometimes *Raking* and ſometimes *Galloping*, but do not bring him to the *Stable* until he is quite dry, and when ſo, then diſmount, and indeavour to make him *Piſs* and empty himſelf; then lead him into his *Stall*, and gently tye his Head up to the Rack with his *Bridle*; which done preſently, as having prepared it before, give him this following *Scowring*.

Take a pint of good *Canary*, an ounce of pure clear *Roſin* bruiſed to fine duſt, and brew them together very well until incorporated together, then put thereto a pint of good *Sallad Oyl*, and brew them alſo well together; and laſtly, take an ounce and an half of *brown Sugar-candy*, finely beaten to powder, and mix them together; then mull all upon the Fire, and being luke-warm, and your *Horſe* newly come in from his *Heat*, as before ſhewed you, draw his Head up to the Rack, and with a *Drenching Horn* give him this *Scowring*, which is ſtrong, and taketh away all manner of molten Greaſe and foulneſs whatſoever.

As ſoon as you have given him this *Scowring*, preſently let his *Legs* be rub'd, and take off his *Saddle* and *Clothes*, and finding his Body dry, run ſlightly over it with your *Curry-Comb*, and after with a *Bruſh*, then duſt well, and laſtly rub over his whole Body with dry *Clothes*, eſpecially his *Head*, Nape of the *Neck*, and about his *Heart*; then Clothe him up warm as at other times, and whiſp him round with great warm *Whiſps*, and if you throw over him a little loſe *Blanket*, it will not be amiſs, eſpecially if the Seaſon is cold.

Your Horſe muſt faſt two hours after the taking the *Scouring*, all which time continue with him, and keep him ſtirring, uſing ſome noiſe, for nothing is worſe than to ſleep or reſt at ſuch a time, and hindereth the operation of the *Medicine*, whereas ſtiring enliventh the Spirits, and ſtirs up thoſe humors that ſhould be removed. After he hath thus faſted upon his *Bridle*, take a handful of *Wheat-ears* (being your *Pollard* that is without rough *Beards*) but before you give it him, put your hands under his *Clothes* againſt his *Heart*, alſo upon his *Fillets*, *Flanks*, and on the neither part of his *Thighs*, and if you find any new ſwet to ariſe, or any coldneſs of ſwet, or if you find his Body to beat, or his breath to move faſt, then do not give him any thing; for it is a ſign that there is much foulneſs ſtirred up by the *Medicine*, and ſo maketh him ſick; therefore in ſuch caſe only take off his *Bridle*, put on his *Collar*, and toſs up his *Litter* that he may lye down, and ſuffer him to take his reſt for about Two hours, leaving the *Stable* dark and free from Noiſe. But if you find no ſuch ſymptoms of Sickneſs, then proffer him the ſaid Ears of Wheat by two or three at a time, and if he eats the handful, give him another; then give him a little *Bundle* of *Hay* as before directed, and draw his *Bridle*, rubbing his Head well. About an hour after he hath had his *Hay*, ſift him a quart of good *Oats*, to which put two or three handfuls of ſpletted *Beans*, which muſt be very clean dreſt from the hulls, ſo that there may be nothing but the ſpleted *Beans* themſelves; to theſe *Oats* and *Beans* break two or three good ſhives of Bread, clean chipt, which give him, and ſo leave him for two or three hours. At Evening before you dreſs your *Horſe*, give him the like quantity of *Oats*, *Beans*, and *Bread*, and when he has eaten them, bridle him up, and dreſs him as before directed; then *clothe* him up, but neither ſaddle him, nor ride him forth for this *Evening* after his *Heat* (he being inwardly foul, and the Scowring yet working in his Body) he muſt not drink any Water. But after he hath ſtood about an hour and a half upon his *Bridle*, take three pints of clean ſifted *Oats*, and waſh them in ſtrong *Ale* or *Beer*, and ſo give it him, which will inwardly cool and refreſh him, ſo well as if he had drank Water. Then having reſted a little while, feed him well that Night at his feeding times with *Oats* and ſplet *Beans*, or *Oats* and *Bread*, or altogether; or each apart, as you find his *Stomach* beſt inclined unto; then put ſome *Hay* in his Rack before you leave him, and go to Bed.

The next day very early firſt *Feed*, then *Dreſs*, *Clothe*, *Saddle*, and *Air* him abroad, giving him Water as hath been ſhewed before; then bring him home, and feed him with *Oats*, *Beans*, and *Bread* as aforeſaid, but give him very little *Hay*, and keep your *Heating* days, and the preparation the day before as hath been ſhewed without any omiſſion, or addition. Thus you ſhall ſpend the ſecond Fortnight, in which your Horſe having received four ſound Heats, and as many *Scowrings*, there is no doubt but his Body will be inwardly clean, then the third Fortnight order him according to the following *Rules*.

The third Fortnight make his Bread finer than before, after this manner; take two Pecks of clean *Beans*, and as many of fine Wheat, grind them on the black Stones, ſearce them through a fine Range, and knead it up with *Teſt* to make it light, then work it up, and bake it as the former.

With this *Bread*, (having the Cruſt cut away, and being old) with clean ſifted *Oats*, and clean ſplet *Beans* feed him this Fortnight, as you did the former Fortnight; alſo you muſt obſerve his *Heating-days*, and the day before his *Heat*, as in the former Fortnight, only with theſe Differences.

Firſt give him not his *Heats* ſo violent as before, but with a little more pleaſure, and not overſtrain him; next, do not after his *Heats* when he comes home, give him any more of the former *Scowring*, but inſtead thereof, immediately upon the end of the *Heat*, after he is a little cooled and clothed up, and in the ſame place where you rub him, by drawing his Head up aloft as you ſet in the Saddle, or raiſing it up otherwiſe, give him a *Ball* ſomewhat bigger than a *French Walnut* with the Rind and all, of that Confection before mentioned, being the true manner of making the *Cordial Balls*.

But to return to our former Diſcourſe: Having thus ſpent the three firſt Fortnights, the fourth and laſt Fortnight you muſt make the Bread much finer than either of the former; as thus: Take three Pecks of fine *Wheat*, and one Peck of clean *Beans*, grind them to Powder on the black Stones, and bolt them through the fineſt Bolter you can get; then knead it up with very ſweet *Ale-Teſt*, and new ſtrong *Ale*, with the Whites of about Twenty *Eggs*: Do not put in any Water, but inſtead thereof you may put in a little new Milk; then work it up, kneading it well; then bake it, and order it according to your former Directions.

With this *Bread* (the Cruſt being cut clean away, and with *Oats* funned, beaten and rub'd over with your hands, then new winnowed, ſifted, and fine dreſt, and with the pureſt ſpleted *Beans*) feed your *Horſe* at his ordinary feeding times, after ſuch manner as you did the laſt Fortnight.

Keep his *Heating days* the firſt Week of this laſt Fortnight as you did in the former Fortnight, only forbearing one *Heat* the laſt Week, and not give him any *Heat*, at the leaſt for five days before his *Match*, but give him long and ſtrong Airings to keep him in Wind; nor need you give him this Fortnight any Scowrings.

If in this Fortnight Morning and Evening, you burn in your Stable, upon a *Chafing-diſh* of Coals, ſome good *Frankincenſe*, or *Olibanum* mixt with *Storax* and *Benjamin*, to perfume and ſweeten the place, it is very good for him, and he will take great delight therein. And in this Fortnight, when you give him any waſh't Meat, waſh it not in *Ale* or *Beer*, but in the *Whites* of *Eggs*, or *Muskadine* which is leſs purſie. Alſo in this Fortnight give him no *Hay* but what he takes out of your Hand after his *Heats*, except he is a very bad Feeder, very tender, and a great *Belly-loſer*.

The laſt week of this Fortnight, if he is a foul Feeder, uſe the *Muzzle* continually; but if he is a clean Feeder, and will touch no *Litter*, then three days before your *Match* it is convenient to uſe the *Muzzle*.

In the Morning before the *Match*, feed well both before and after *Airing* and *Water*, as at other times before Noon; and after Noon leſſen his Meat a little.

Before and after Evening *Airing* feed him as at *Noon*, and water as at other times; but be ſure to come home before Sun-ſet.

This day cool him, ſhoe him, and do all extraordinary things of Ornament about him, provided there be nothing to give him offence, or to

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hinder his Feeding, or any other material or beneficial Action: For ſometimes it happens that when they have been ſhoed with light *ſhoes*, and other actions of Ornament done about them the Night before the *Courſe*, they have taken ſuch notice thereof, that they have refuſed both to eat and to lye down; but ſuch *Horſes* are old, and long-experienced in this Exerciſe: For as to the nice and ſtrait platting up of their *Tails*, although Ornamental, yet I do not much approve thereof, by reaſon it may give offence to the *Horſe*, therefore forbear thoſe unneceſſary Ornaments. And as to the neceſſary things to be done to him, rather do them the day before, becauſe on the Morning of the *Courſe* he ſhould find no trouble or vexation.

On the *Match* Day come to him very early, take off his *Muzzle*, rub his *Head* well, and give him a pretty quantity of *Oats* waſht in *Muſkadine*, or in the Whites of *Eggs*; but if he refuſeth them, then give him fine dreſt *Oats*, dry and mixt with a little *Wheat*, or with your lighteſt *Bread*, and as to *Beans* give him none: Of any of theſe *Foods* give him but ſuch a ſmall quantity, as may keep life and ſoul together; then if he be a *Horſe* that is an evil emptier, retaining his Meat long, walk him abroad, and in the places where he uſeth to Empty there entice him to Empty; which as ſoon as he hath done, bring him home, put on his *Muzzle*, and let him reſt until you have notice to make ready and lead forth: But if he be a free Emptier, then you need not ſtir him, ſuffering him to lye quiet.

When you have notice to prepare for leading him forth, then come to him, and having waſht his *Snaffle* in a little *Muskadine*, take off his *Muzzle* and Bridle him up; but if you think him too Empty, you may give him three or four Mouthfuls of the waſht Meat laſt mentioned, and then Bridle him up and dreſs him. After you have pitcht your *Saddle* and *Girts* with *Shoemakers-Wax*, put it on his back, girting it as gently as may be, ſo as he may have a feeling, but no ſtraitneſs; then lay a *Sheet* over the *Saddle* next his *Skin*, and over it his ordinary *Cloths*, *Wiſping* them about with ſoft Wiſps; then if you have a *Counter-pane* or *Cloth of State* for ſhew ſake, faſten it above all. All theſe things being done and you are ready to draw out, then take half a Pint of the beſt *Muskadine*, and give it him in a *Horn*, and ſo lead him away.

In all your Leadings upon the Courſe, of gentle and calm motions, ſuffering him to ſmell upon every Dung that thereby he may empty himſelf, and in ſpecial places of advantage, as where you ſhall find *Rubbes*, long *Graſs*, *Heath*, or the like, walk him and entice him to Piſs; but if you find no ſuch help, then in ſpecial places upon the *Courſe*, and principally towards the latter end, and having uſed the ſame means before, break ſome of your *Wiſps* under his *Belly* to cauſe him to Piſs. And in your Leading, if any white or thick Froth or Foam ariſe about his Mouth, wipe it away with a clean *Handkerchief*, carrying a ſmall Bottle of clear Water with you to waſh his Mouth now and then with.

When you come to the place of Starting, before you unclothe him, rub and chaſe his *Legs* with hard *Wiſps*; then pick his *Feet* and waſh his *Mouth* with Water; then unclothe him, Mount his *Rider* and Start fair, and ſo with Succeſs unto him.

The *Courſe* being perform'd, you muſt order him, as after a ſharp *Heat*; for which I refer you to my Directions about *Heats*.

CHAP. XVI.

Of Keeping any Horſe for Pleaſure, Hunting, Travel, &c.

I Would have your Keeper of theſe *Horſes* to riſe early in the Morning by Day-break, or before, according to the Seaſon of the Year, and to ſift your *Horſe* about three Pints of good dry old *Oats*, and put thereto one or two handfuls of ſpleted *Beans* with the Husks, and give it him. After he has eaten them, let him dreſs him according to the order of good *Horſmanſhip*; that is, Firſt *Curry* with the *Comb*, then Duſt, then rub with the *Bruſh*; then Duſt and rub with your wet Hands, after that with a clean Woollen-cloth, next with a clean Linnen-cloth; then pick all obſcure places, and laſtly *Comb* down his *Main* and *Tail*. Having thus done, Saddle him and ride him forth to Water, warming him very moderately both before and after Water, and ſo bring him home without Sweat. Then after you have rubbed him all over, *Clothe* him and let him ſtand on his *Bridle* above an hour; after which give him the former quantity of the ſaid *Provender*, and when he hath eaten it, give him in his Rack a pretty Bundle of *Hay*, and ſo let him reſt until after Dinner, and then give him the former quantity of the ſaid *Provender* and ſo let him reſt till the Evening; only give him more *Hay*, if occaſion requires. At Evening Dreſs him well, according to the Directions for the Morning; then Ride him forth to Water, obſerving the ſame Method as in the Morning; and when you come home Dreſs and Clothe him up, as aforeſaid, and let him ſtand on his *Bridle* as before; then give him the former quantity of *Provender*, letting him reſt till about Nine of the Clock, at which time give him the former quantity of *Provender*, and a pretty good Bundle of *Hay*, and ſo leave him till the Morning.

This Method obſerve concerning his ordinary Keeping at home where he hath Reſt, and that you may diſpoſe of Hours at your pleaſure; but if you are on a *Journey*, or the like, ſo that you can't obſerve theſe Times, then divide the main and whole quantity of Meat into four parts, and by conſequence into greater quantities, and give him them at the beſt conveniency, always obſerving

ſerving to give the leaſt quantity before *Travel*, as a third part before taking Horſe, and the two others after you come to Reſt.

The reaſon of my dividing his Meals is, becauſe it is very advantagious for the *Horſe*; for to give it him at twice fills the Stomach more, makes the Digeſtion worſe and the Appetite weak; whereas to give little and often, makes the Stomach always craving, the Digeſtion always ready, and the Appetite never wanting. I muſt confeſs it is a greater trouble, requiring more attendance; but who will be ſparing of his *Grooms* pains for the benefit of a good *Horſe*?

If you intend to give him an *Heat*, as to *Hunt*, *Travel*, *Gallop*, or the like, which were not amiſs to do two or three times a *Week*; then obſerve all your former Obſervations, only the Night before give him little or no *Hay*. In the Morning early before his *Heat*, and before his *Dreſſing*, give him three or four handfuls of clean ſifted *Oats*, waſht either in ſtrong *Ale* or *Beer*; then Dreſs him, Saddle him, and give him his *Heat*. But if it be ſudden and violent, then let it be when he hath very well emptied himſelf.

After his *Heat* rub him very well, and bring him dry into the Stable; then Clothe him up warm, and let him ſtand on his *Bridle* about two Hours; then give him a little Bundle of *Hay* to tear out upon his *Bridle*, and an hour after feed him, as hath been already ſhewed, only with the firſt *Oats* give him an handful or more of *Hemp-ſeed* well duſted and mixed.

At Night warm him a little Water and give it him luke-warm; then about an hour after give him his *Provender*, with a pretty good Bundle of *Hay*, and ſo let him reſt till the next Morning.

The next Morning do all things as in his ordinary Keeping.

Let him ſtand on Litter both Night and Day; but change it often, and keep the *Planks* clean.

If you intend to *Travel* a Journey, in the Morning then give him no *Hay*, or but little the Night before: If you take your Journey in the Afternoon, then give no *Hay*, or but little in the Morning.

In your Journey ride moderately the firſt hour or two, but after according to your occaſions or fancy. *Water* before you come to your *Inn*, if poſſible; but if you can't, then give warm Water in the *Inn* after he is fully cooled.

Oil of *Trotters* is excellent, being applied very warm and well chafed in, for the keeping of his *Sinews* and *Limbs* nimble, as alſo to help lameneſs and ſtiffneſs.

Neither Waſh your *Horſe*, nor Walk him; for the firſt endangereth *Foundring* in the Body or Feet, and breedeth all *Surfeits*, and the latter is the ground of all ſtrong Colds, which turn to *Glanders* and *Rottenneſs*: But if neceſſity compel you to either, as foul Ways and long Stays, then rather waſh his *Legs* with Pails of Water at the *Stable-Door*, than to waſh him in a Pond or River. And for Walking, rather ſit on his Back to keep his Spirits ſtirring, than to lead him in the hand.

This is ſufficient Directions for clean and ordinary Keeping a *Horſe*.

CHAP. XVII.

Of ſeveral Excellent Medicines for curing Maladies moſt frequent in Horſes.

TO Treat at large of *Medicines* and *Farriery* would take up a Volume it ſelf; *Markham*, *Snape*, and others have done it already; and all Gentlemen that keep good *Horſes* have their particular *Farriers*, in the chooſing of whom they ought to be very cautious. This *Chapter* gives you ſome particular *Medicines* and Directions for ſuch *Maladies* and *Miſchances* that very often happen, being ſuch as have been Approved of by Perſons of Quality, and very good *Horſmen*. But for as much as he is eſteemed a better *Horſman*, that can keep his *Horſe* in good health (by preventing ſuch like *Maladies*) than he that can cure them, I ſhall begin with ſome Obſervations relating thereunto. And firſt,

Of Sickneſs in General.

WHenſoever you perceive your *Horſe* to forſake his Meat, to Droop, or ſhew any Symptom of Sickneſs, if it be not great, forbear letting Blood, which is a great weakning of the Spirits; but if the Signs be great and dangerous, then let Blood immediately; and for three Mornings together (the *Horſe* being Faſting) give him half an Ounce of a Powder called *Diahexaple*, brewed either in a Pint of fine Syrup of *Sugar*, or for want thereof the like quantity of *Moloſſes*; alſo a Pint of *Dragon-Water*, or *Carduus-Water*, or a Quart of ſweet ſtrong *Alewort* will do as well; This Drench give him in a *Horn*, and if he is of ability of Body, Ride him after it in ſome warm place, ſuffering him to Faſt about two hours: At Noon give him a ſweet *Maſh*, Clothe him warm, and let him not drink cold Water.

This *Diahexaple* Powder being not commonly known, and by conſequence not rightly prepared, I ſhall here give the *Receipt* to make it.

Take of the Grains of Ivory, Paradice *and* Myrrh, *of the Roots* Gentian, Enula Campana *and* Turmerick, *of each a like quantity; then beat and ſearce them into a ſubtile Powder, and give him ſuch a quantity thereof as before directed.* This comforts and ſtrengthens the inward Parts, helps the Lungs, reſiſts putrefaction of Humors, opens Obſtructions, and if taken in time, not only recovers him, but prevents many Diſtempers.

Obſer-

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Observations relating to Sickneſs.

IF you find in your Horſe a ſhortneſs of Breath, loathing of his Meat, an heavineſs of Countenance, dull Eyes, ſtaring Hair, a rotten or dry Cough, an extream Looſneſs, or coſtiveneſs, yellowneſs of the Eyes and Skin, no caſting his *Loat*, lean and hide-bound, to have a ſtaggering Pace, a Frantick Behaviour, extraordinary lying down, or beating himſelf, or a faint or cold Sweat, all theſe are apparent ſigns of Sickneſs.

Obſervations from the Dung.

YOU ought to obſerve his *Dung*, which is a certain Rule to know the condition of his Inward Parts; yet before he paſſeth his Judgment, he ought to conſider what Feeding he hath had, which is a great matter. For example, if the *Dung* be of a pale and whitiſh yellow Complexion, and clear, hanging together without ſeparation, more than as the weight breaks it in the falling, being neither too Thick nor too Thin, theſe are Signs of his being clean, well fed, and free from *Maladies*; if it be well coloured, yet fall from him in round knots, then 'its a Sign of foul feeding, and he hath either too much *Hay*, and too little Corn, or Oats, too much *Litter*. If his Dung be rediſh and hard, then he hath had too Strong *Heats*, and Coſtiveneſs will follow; if it be pale and looſe, it denotes inward coldneſs of Body, or too much moiſt Feeding; if it be in round *Pellets*, and blackiſh, or brown, it ſhews inward heat in the Body; if it be *Greaſy*, it ſhews foulneſs, and of that *Greaſe* is molten, but can't come away; if he voids *Greaſe* in Groſs Subſtance with his Dung, if the *Greaſe* be white and clear, then it comes away kindly, and there is no danger, but if it be yellow and putrified, then the *Greaſe* hath lain long in the Body, and Sickneſs will follow if not prevented.

Concerning Feeding.

OBſerve that if there be any *Drink*, or *Meat* that is good for the *Horſe*, and if he refuſe to take it, do not force him to it, but uſe gentle Means, tempting him when he is moſt Thirſty, or Hungry; alſo mix the Drink, or Meat he loveth beſt, with that which he loveth worſt, till both be made Familiar unto him.

Concerning the State of his Body.

YOU muſt obſerve that the Strongeſt State of Body, which is the Higheſt of Fleſh, provided it is good, hard and without inward foulneſs is the beſt; yet you muſt take notice that his *Shape* and Feeding are to be conſidered: As to his Shape of Body, ſome that be round, plump, and cloſe knit will appear fat, when really they are lean and in Poverty; and others that are Rawboned, Slender, and looſe knit together, will appear Lean, Deformed and Poor, when they are Fat, Foul, and full of Groſs Humours: So likewiſe as to their *Feeding*, ſome will Feed outwardly carrying a thick Rib, when inwardly they are Clean, and without all manner of Foulneſs; and there be others (as the latter) that appear clean to the Eye, ſhewing nothing but Skin and Bone, when they are full of inward Farneſs; In this Caſe there are two helps, the one inward, and the other outward: The Inward help is only ſharp Exerciſe which diſſolves and Melts the Foulneſs, and ſtrong *Scourings*, which will bring it away: The outward Help is Handling and Feeling his Body, eſpecially his *Ribs* towards his Flank, and if his Fleſh generally handle looſe and ſoft, your Fingers ſinking or pitting in, 'tis a Sign of his Foulneſs; but if his Fleſh be hard and firm, only upon his hindmoſt Rib it handles ſoft and Downy, 'tis a Sign there is *Greaſe*, and Foul Matter within, which muſt be removed, let him appear never ſo lean. If he be Fat and Thick, and as it were cloſed up between the *Chaps*, or if his *Jaws* handle full and Fleſhy, 'tis a Sign of much Foulneſs, both in the Head and Body; but if he handle Thin, Clean, and only with ſome Lumps, or ſmall *Kirnels* within his *Chaps*, in ſuch caſe it is a Sign only of ſome cold newly taken.

Concerning his Hair.

YOU muſt well obſerve your *Horſes Hair* in General, but eſpecially his Neck, and thoſe parts that are uncovered; for if they be ſleek, ſmooth, and cloſe, then he is in good Caſe, but if his *Hair* be rough and ſtareing, then he is inwardly cold at the Heart, wants Cloths and warm keeping, or elſe there is ſome Sickneſs creeping upon him.

Concerning Lameneſs, or Stiffneſs.

TAke notice that if your *Horſe* be ſubject to *Lameneſs*, or *Stiffneſs* of *Joynts* or *Sinews*, Subbating or tenderneſs of Feet, firſt give him his Hears upon ſoft and ſmooth Ground, forbearing hard and Stony *High-ways* or the like.

Obſervations from the Urine.

ALthough it is the General Opinion that the *Urine* is a deceiver, yet ſomething may be diſcovered thereby, *viz.* If the *Urine* be of an High and Ruddy colour like Blood, then he hath been Over-ridden, or Ridden too early after *Winter-graſs*; if the *Urine* carry a white cream on the top, it ſhews a weak Back, and a Conſumption of Seed; if it be of a pale yellowiſh colour, rather thick than thin, and of a ſtrong ſmell, it is an healthful, ſound and good *Urine*; if it be of an high Complexion, and clear like old *Marchbeer*, his Body is inflamed, and he hath taken ſome Surfeit; A green *Urine* ſhews a Conſumption of the Body; *Urine* with Bloody ſtreaks, denotes an *Ulcer* in the *Kidneys*, and a black thick cloudy *Urine* ſhews Death.

Concerning the Privy Parts.

IF your *Horſes* Stones hang down, ſide or long from his Body, he is out of Heart or Luſt, and is either ſick of *Greaſe*, or other foul Humours; but if they be cloſe couched up, then he is in good plight and health.

Having given you theſe Obſervations concerning the State and Condition of your Horſe, our next buſineſs ſhall be to proceed to *Diſeaſes*, and their *Cures*.

Receipts of Julips, Gliſters, *and* Potions *for cooling* a Horſe, *Over-heated by violent Exerciſe, approved of by the late Duke of* New-Caſtle.

For a Cold.

TAke half a Pound of *Honey*, with as much *Treakle* mixt together, then take a Pound of *Cummin-ſeed*, an Ounce of *Bay-berries*, and an Ounce of *Anny-ſeeds* all beaten to powder, which mix together, and put ſo much thereof into the *Honey* and *Treakle*, as will make it thick like a *Hilly-puddin*: This give your Horſe both before and after his *Riding*.

To Comfort a Horſe Over-ridden.

TAke a Pint of new Milk, and put therein the Yolks of three new-laid Eggs well beaten, three penniworth of *Saffron*, and two or three Spoonfulls of *Sallet-Oyl*, let them be luke-warm, and given to him in a *Drenching-horn*.

Honey is a very ſoveraign thing for the *Lungs*, for a Cold, and to open all obſtructions; and if you put a good Spoonful thereof in his Oats for ſome time together, it will work notable effects, and recover a very *purſey Horſe*.

Horſes of great Exerciſe, or ſuch as are over-heated muſt be often let Blood, ſometimes three or four times in a few days, until you find good Blood to come.

To let a *Horſe Blood* in the Mouth, and then to rub it with Salt, and cauſe him to drink his Blood, is an excellent thing; but you muſt *purge* him well, that his *Greaſe* may come away, for Horſes of great Exerciſe would elſe be always foundred in the Body, and then they will never thrive, until that Melted *Greaſe* be brought away.

The beſt *Purge* is an Ounce of *Alloesſicatrina* lap't up in freſh Butter, and made into *Pills*, which give him after he has reſted a while. Then give him this following *Julip*.

Take *Mell Roſarum*, Conſerve of *Damask Roſes*, and *Burrage*, with Syrup of *Violets*, of each four Ounces, *Burrage*, *Endive*, *Suckory*, *Bugloſs*, and *Plantain*-Water of each about a Pint and a half, which ſaid *Water* and *Conſerves* uſe thus. Put the *Conſerves* into a *Mortar*, and beat them together; then mix them well together with the *Waters*, and give it your Horſe in a Drenching-horn cold, and if you add Syrup of *Lemmons* it is very good; of this Drink give him twice or thrice a week for about a Month, and let him reſt afterwards, and it will be effectual.

All the time of this great *Heat*, feed him with *Wheat-bran* amongſt his *Oats* waſh't in ſtrong *Beer*, or *Ale* if he likes it; for *Bran* is very good to get out his *Belly*, and to moiſten him, becauſe it dries up all ſuperfluous humours that heat him. Likewiſe in his Water, when he drinks put ſome of the *Bran*, which is very good to cool and moiſten him; and to looſen his skin if he be *Hide-bound*, which Heats do occaſion.

Lettuces, *Succory Roots*, and *Endive Roots*, are very good to cool him, being boyled in the Water he drinks: And during the time of his Cure, let him have no violent Exerciſe, only gentle walking.

To refreſh a *Horſe*, give him *Carots* with his *Oats*, and waſh his *Oats* in ſmall *Beer*, which is very good.

A cooling Julip in a Fever.

TAke *Barley-water* a Quart, two Ounces of Syrup of *Violets*, and an Ounce of Syrup of *Lemons*, mix theſe together, and give him to quench his thirſt.

If he is looſe of Body in his *Fever*, to bind him take one Ounce of *Ivory*, with as much *Harts-horn*, raſp them, and put them in three Quarts of Water, which muſt boyl till about half is conſumed, then ſtrain it through a Cloath; and to this Liquor put four Ounces of the Juice of *Barberies*, and one Ounce and a half of Syrup of *Pomegranates*, and give it him in a *Drenching-horn* cold.

A cooling Potion.

TAke a Quart of *Whey*, four or five Ounces of Syrup of *Violets*, the like quantity of *Caſſia*, with a little *Manna*; and this will both cool and purge him gently. This given in a *Gliſter* is very cooling to the *Bowels*.

All theſe cooling things are very good for ſurfeited and over-heated *Horſes*: But firſt give the *Purge* of *Aloes* to bring away the *Greaſe*.

For the Bots and all manner of Worms.

TAke a Quart of new *Milk*, and as much clarified *Honey* as will make it very ſweet; give it him in a *Horn* luke-warm early in the Morning, having faſted all Night before; then *bridle* him up, and let him ſtand tied to the empty Rack for about two hours. Then take half a Pint of *White-wine*, and diſſolve into it a good Spoonful of *Black-ſoap*, and give it him, cauſing him to faſt about two hours after; and this will cauſe him to void the *Worms* in great abundance. Or take *Salt* and *Water* and give it him in a *Horn*.

For a Looſneſs.

TAke a Quart of *Red-wine*, ſet it on the fire, put in it one Ounce and a half of *Bole-armony* made in fine Powder, and two Ounces and a half of Conſerve of *Sloes*, then ſtir and mix them well together; then take it off the fire, and put thereto one or two Spoonfuls of the Powder of *Cinamon*; mix theſe together, and give him to

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drink. Let him fast two Hours after, and let him eat no wash't Meat: *Hay* is wholsome, so is *Bread* and *Oats*, so as they be well mixt with *Wheat* or *Beans*, but not otherwise.

An excellent Scowring when others will do no good.

TAke a quarter of a Pound of sweet *Butter*, half as much *Castle-soap*, beat them well together; then put thereto two Spoonfuls of *Hempseed* bruised, of *Aniseeds* bruised a handful, one Ounce of *Sugar-candy*, half a spoonful of *Rosin* finely bruised; work all these into a Paste, and give it him made up in Pills after his *Heat*, or when you have warmed him, and stirred up the Grease and Foulness within him.

For the Spleen.

MAke a Plaister of *Oxiceraceum*, spread it upon Sheeps Leather, which lay on, suffering it to lye until it come off it self.

A Glister to Expel Wind.

TAke *Fennel Seeds* and *Aniseeds* of each two Spoonfuls, bruise them, then put thereto half a handful of *Pellitory* of the Wall, *Camomile*, *Rosemary flowers*, and *Penny-royal*.

For the Wind-Collick.

BOyl a spoonful of *Cummin seeds* with a few *Camomile flowers* in Posset drink, and give it him to drink; which is good to expel the Wind.

For a Horse that pisseth Blood.

TAke a spoonful of *Taragon* steep it in *White-wine*, and as much *Poppy seeds* beaten as will lye upon a shilling, give this in *White-wine*, which will effect the Cure.

For a Cough.

TAke the Root of *Gentian*, slice, dry, and beat it to Powder, of which give him fasting as much in half a Pint of his own *Water*, as will lye upon a shilling. This must be given him every third day, until you see his *Cough* or *Heaving* to be removed; and all the time of his Cure let him stand in the *Stable*.

To cause a Horse to piss, that has the Wind-Collick.

TAke a quarter of a Pound of *Castle-soap* small, to which put two Ounces of *Diatheia*, beat them well together in a *Mortar*, make them up into pretty big *Balls*, and so keep them for use, for they will continue good a year. Take one of the *Balls*, crumble it into a Pint and a half of strong *Beer* scalding hot, to dissolve the *Ball*, then let it stand till it is luke-warm, and so give it him in a Horn, and let him fast about an hour; this will empty him of all his Piss.

To make a Horse Stale or Piss.

TAke the quantity of a *Walnut* of *Castle-soap*, boyl it a little in a Pint of strong *Beer*, and give it him in a Horn luke-warm, and it will cause him to Piss.

To cause a Horse to Vomit.

TAke two large Roots of *Polipodium* of the *Oak*, wash and scrape them very clean, and tye it to his *Snaffle* or *Bit*, then let it be steeped in *Oyl* of *Spike* a whole Night, and in the Morning fasting put on his *Bridle* with the Roots tied to the *Bit*, and ride him softly for about an hour, with it in his Mouth, and if he be troubled with any *Flegmatick*, or *Rheumatick* humours, or with any cold or filthy Matter that clogs or anoys his *Stomach*, it will cause him to cast it forth at his *Muth* or *Nose*: It will also cause him to *sneeze* and *cough* much, purging forth filth and slimy Matter, so that it will soon cleanse his Body, and purifie his Blood. This you may give to a *Horse* newly taken from *Grass*, or to one that has taken a *Cold*, or is *foggy* and *purse*; this being done, give him *White-wine* and *Honey*, as also a *Cordial*.

A Purge.

TAke a Quart of strong *Ale-wort*, a quarter of a Pint of *Honey*, two Ounces of *London Treacle*, mix and brew them all together, and give it him luke warm, then keep him upon the *Bit* about Six hours warm clothed and littered; then give him a sweet *Mash*, and *White-water*, Rack him with sweet *Wheat-straw*, *Oats* and *Bran*; this both purgeth and comforteth: And two or three days after give him this following Drink.

Another Purge.

TAke a Pint of *White-wine*, put in it one Ounce of *Senna* to steep all Night, in the Morning early strain it, and put therein one Ounce of Powder of *Aloes*, half an Ounce of *Agarick*, and a Spoonful of *Liquorish* Powder; mix these well together, and give it him luke-warm in a *Horn*, then ride him gently about a quarter of an hour after it, and so let him up warm, well clothed and littered; let no Air come to him, nor suffer him to eat or drink for about six hours: At Night give him a *sweet Mash*, and let his Meat be sweet *Wheat-straw*, *Oats* and *Bran*: The next Day let him Blood, and prick him in the third Furrow of his Mouth; and if his Blood be bad, take about two Quarts from him: But if good about a Quart; keep him warm, and give him *sweet Mashes* or *White-water*, and put into his Drink either the Powder of *Brimstone* or *Elecampane*, *Fenugreek* or *Turmerick*, or one or more together, which being well mixt, put thereof into his Drink a Spoonful at a time. This is very good to cool and purifie the *Blood*, to purge *Choler* and other peccant Humours. This *Purge* is not only good for *Horses* newly taken from *Grass*, but for those that are sick or surfeited.

Glisters.

Glisters.

A *Glister* is a very good Preparative to a *Purging Drink*, cleansing the *Guts*, and refresheth the Vital Parts; so that before he give a *Drink*, whether *Purging* or otherwise, if the *Horse* be not soluble in Body, that after Blood-letting, the next day he give a *Glister*.

A *Decoction* is a *Broth* made of divers *Herbs*, as *Mallows*, *Marsh-Mallows*, *Camomile*, *Pellitory*, and sometimes *white Lilly Roots*, which boyl in Water till the third part is consumed. Sometimes instead of *Herbs* and *Water*, fat *Beef Broth*, *Milk* or *Whey* will serve.

The quantity of *Broth*, *Milk* or *Whey*, is according to the age, strength, and bigness of the *Horse*; for if a strong, large, fat and lusty *Horse*, three Pints is usual, otherwise a Quart is sufficient: It is usual to put in half a Pint of Oyl, two or three Drams of *Salt*, and sometimes *Verjuice*, or *Honey*, as occasion requires.

The usual Druggs are *Senna*, *Cassia*, *Aniseeds*, *Agarick*, also the Oyls of *Camomile*, *Violets*, and *Dill*, *Sugar-Candy* and such like. As to the quantity of *Druggs*, three ounces in a Glister is the most used, often less; and put in not above four ounces of *Butter*, and when you give it, let it be lukewarm.

Your *Horse* should be empty when you give it, and before you give it, Rake him, let him keep it about Half an Hour, holding his *Tail* close to his Fundament all the while.

The length of the *Glister-pipe* should be about a Foot long in the Shank, and put it home, and draw out the *Pipe* by Degrees.

For a Vein that swells upon letting Blood.

TAke black *Pitch*, white *Pitch* and *Rosin*, of each a like quantity, boil them together, and lay it on hot, with a flat stick; and then flock it, and this doing, once in four or five days will take down the Swelling; he must be housed, and kept with dry meat the time of his Cure; you may anoint it with Oyl of *Popaleon*, or with *Soap* and *Brandy*.

A Horse Burnt by a Mare.

THis is known by the Mattering of his Yard within; for Cure take a Pint of White-wine, in which Boil a Quarter of a Pound of *Roch-Allom*, and when it is cool, Squirt it with a Syring as far into his Yard as you can; and it will effect the Cure.

The Staggers.

THis Disease proceeds from corrupt Blood, or Gross ill Humours that oppress the *Brain*, from whence proceeds a vaporous Spirit, dissolved by a weak heat, which afflicts the whole Head. For Cure, first take a pretty long strait Stick well smooth'd about the bigness of a *Tobacco-pipe*, and at one end cut a Notch, this Stick put up to the top of his Head, jobbing it a little hard, and turn the Stick, which will occasion him to Bleed freely; then give him this following Drink, Take an Ounce of *Aniseeds*, and as much *Turmerick* beaten small in a Mortar, a penny worth of *Aquavitæ*, a Pint and a half of Mild *Beer*, a Pint of *Verjuice*, or for want thereof a quarter of a Pint of *White-wine-vinegar*, and put it to the *Beer*, and the rest of the *Ingredients*, which make luke-warm, and give it him in the Morning fasting; as soon as he hath took it, take a handful of *Herb-grace* beaten small in a Mortar, a penny worth of *Aquavitæ*, and put half the *Aquavitæ* into one Ear, holding it upright in the hollow of your hand, and put half the *Herb-grace* in after it; then put in *Wool* or *Tow*, and tye up the Ear with a *Garter*, and the like do to the other *Ear*, and tye them both up together; after Twenty four Hours untye his *Ears*, and take out the *Wool*, and *Herb-grace*; the next Day in the Morning let him Blood on both sides of his Neck, and save about a Pint of the *Blood*, and put thereto a handful of Salt, stir it well together, and give it him fasting; four or five Hours after give him sweet *Hay*, and at Night, warm *Water* and *Bran*: After you have given him the first drink, tye up one of his Fore-legs, and strew good store of Litter under him, and so let him take his rest, and he will either recover in a Day or Two, or Dye; the Vinegar will make him piss, and the *Aquavitæ* cause him to sleep: If he comes not to his Stomach, then give him *Honey*, and *White-wine*, and a *Cordial*; when you let him Blood in the Head with your Coract-Horn, let him Blood in the third Furrow of his Mouth, and let him bleed well; also let him *Blood* in the Griffle of his *Nose*, with a long Bodkin, or *Shomakers Awl*.

For a Broken-winded Horse.

TAke Boars Dung, dry it to Powder, put a Spoonful of it into a Quart of *Milk* newly taken from the Cow, or else made luke warm, and give it him: If you see that this quantity will not make him sick the first time you give it him, then give him two Spoonfuls more of the *Powder*, and this in four or five times taking will Cure him. This drink must be given every third day. A Spoonful of the Powder of a *Hedg-hog* being given, doth much add to the Cure.

To stop Bleeding.

LEt him Blood in both the *Plate-veins*, then wind a *Thum-band* of wet Hay about his Neck, so long to come from his *Ears* to his *Breast*, and so keep it wet until you find the Blood to stanch.

Or take *Bettony*, and stamp it in a *Mortar* with *Salt*, put it into his Nose, or apply it to the Wound, and it will stanch it.

For a Shoulder-strain.

FIrst tye up his sound *Leg* with a *Garter* or *List*, then walk or drive him on his other three *Legs*, that he may lay the weight of his Body

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Body upon the lame *Leg*, and so keep him until he begin to Sweat at the *Cods* and *Ears* with pain. The reason of this is to see the *Plait-Vein* the plainer; then let down the lame *Leg* and the *Vein* will appear plainer; but if it doth not yet appear visible enough, then heat a little *Water*, and bathe the place grieved therewith, which will cause it to appear bigger; then let him Blood, and when you see the Blood is come into the *Plait-Vein*, and that the *Vein* is plain enough to see and feel, tye up his lame *Leg* again, and bleed him there on that side the bottom of his *Cheſt* his lame Leg is on. Let him bleed about a Quart or two, and the greater the Lameneſs is, the more let him Bleed; after he has bled about a Quart on the ground; put into a *Bowl* a good handful of Salt, and let him bleed about another Quart, keeping the *Blood* and *Salt* always ſtirring to prevent clodding; then ſtop the ſaid *Plait-Vein* with a piece of *Lead* to hinder more bleeding. Then having in a readineſs about an Ounce and an half of Oyl of *Turpentine*, and as much Strong *Beer*; put them into a *Glaſs-Vial*, ſhake them well together, bathe it well in with your hand all about his *Shoulder*, his *Breaſt*, and down to his *Knee*; then take the *Blood* and *Salt*, and bathe that as the former; then ſet him up to his Meat, and with a *Garter* or *Liſt* tye both his *Fore-legs* together as cloſe as you can; the next day untye them, take him out and walk him, and if you find he can go pretty well, ride him gently about a Mile, and ſo ſet him up again, tying his *Fore-Feet* together, as before directed; but if he goes not well the firſt day, do but walk him the ſecond day; and the third day after his firſt dreſſing, do not only tye his *Legs*, but ſtat a Stick on both ſides, like a Wedge, about the bigneſs of a Sixpence; this drive between the *Toes* of his *Shoes* and the *Toe* of his *Foot* faſt, ſo that it may not come out; and always whilſt he ſtands ſtill in the *Stable* tye his *Legs* cloſe, and peg him with a *Wedge*; and when you take him out to walk or ride, untye his *Legs* and take out the *Wedge*. Do this every Night and Day until he is cured, which will be in a few days, if it be newly taken. To let *Blood* once, and to Anoint it once with Oyl of *Turpentine* and *Beer*, and once with the *Blood* and *Salt*, with the help of tying his *Legs* and wedging them, as aforeſaid, is ſufficient.

Hogs-Greaſe is very good for a *Strain*.

For a Sinew-ſprung Horſe.

TAke a Pint of *Linſeed Oyl*, boyl it, then put in three pennyworth of *Aquavitæ*, ſtir them together and anoint his *Legs* therewith.

For a Back Sinew-Strain, or any Grief, Pain, Straitneſs, Shrinking, or Numneſs of Sinews or Joynts.

TAke a fat Sucking Maſtive *Whelp*, Flay it and bowel it; then ſtop its Body full of *black Snails* and *gray Snails*, Roaſt it at a reaſonable good *Fire*, and when it begins to warm baſt it with ſix Ounces of Oyl of *Spike* made yellow with *Saffron*, and the like quantity of the Oyl of *Wax*. The Dripping and Moiſture that falls from it, ſave, and keep in a Gally-Pot, with which anoint the grieved place, working it in very hot, holding a hot Bar of *Iron* before it; And thus do every Morning and Evening until it is cured.

For Greaſe fallen into the Legs, and the Scratches.

TAke of *Nerve-Oyl*, *Train-Oyl*, and Oyl of *Bays*, of each half a Pint, with the bigneſs of an Egg of *Alom*; boil theſe well together; then having cleanſed the Sores and opened the *Pultis*, if there be any, with Salve anoint the place grieved.

Alſo for the *Scratches*; Take *Verdigreaſe* and Burnt *Alom* mixt together, and ſo apply it, keeping him dry.

A Purgation for a Horſe that is ſick of his Greaſe, or any Coſtiveneſs.

TAke a Pint of good old *Whitewine*, ſet it on the Fire and diſſolve it in a lump of *Caſtle-Soap* as big as a large *Pigeons-Egg*, then ſtrain them well together on the Fire; then take it off, and put into it two good handfuls of *Hempſeed* finely beaten, with an Ounce and an half of good *Sugar-Candy* beaten to fine powder, mix all theſe well together; then having warmed the *Horſe* to ſtir up the *Greaſe* and other foul Humors, give him this to drink, and walk him for a little while after it to make the Potion work; then ſet him up warm, and after a little ſtirring him in the Stable, if he grows ſickiſh let him lye down; then after two or three hours faſting give him a ſweet *Maſh*, and ſo feed him as at other times.

For a Spavin, Splint, Curb, or Ring-bone.

FIrſt, Clip away the *Hair* all about the Excretion, next take a piece of *Alom'd Leather* juſt as big as the place where the Hair is cut away; then ſpread the ſaid *Leather* round the edge with a little *Shoemakers-Wax*; then take the Herb *Sparagus* (which hath the virtue to raiſe *Bliſters*) bruiſe it in a Mortar, and lay it on the *Leather* in the middle where the *Wax* is not, which ought to be the bigneſs of the Knot or Excretion, and bind it faſt thereon, and ſo let it lye (if in the Spring or Summer, when the *Sparagus* is in its virtue) two or three hours; but if in the Winter when it has not that virtue, then add to it a drop or two of *Origanum*, and let it lye on a day, and be ſure tye up the *Horſes* Head for about two hours, leſt he bites it away. When you have taken off the *Plaiſter*, anoint the place with *Train-Oyl* luke-warm, and you ſhall find no *Knot*.

To

To make the Hoofs grow quickly, and to be tough and ſtrong.

TAke ſeven Ounces of Juice of *Garlick*, two Pound of old *Hogs-greaſe*, and one handful of *Aſſes* or *Cows-Dung*, mix them and boyl them all well together, and with this both ſtop his feet and anoint the *Crownets* of his hoofs.

For any Founder, Surbait, or the like in the Feet.

FIrſt, Pare thin, open his Heels wide, and take a good quantity of the Blood from the *Toes*, then tack on a *Shoe* ſomewhat hollow; next take *Frankinſence*, and rouling it in a little fine *Cotton Wool* or *Bombaſt*, with an hot *Iron* melt it into the Foot betwixt the *Shoe* and the *Toe*, untill the Orifice where the Blood was taken away is filled up; Then take half a Pound of *Hogs-greaſe*, melt it on the Fire, and mix it with *Wheat-Bran* to make it thick like a *Pultis*; then ſtop up his Foot therewith as hot as he can endure it, covering it with a piece of an old *Shoe*, and ſplint it up, cauſing him to ſtand ſtill for three or four days; and if occaſion requires, renew it till the Cure is perfected.

A general Salve for any Sore ſwelling.

TAke *Turpentine*, *Black Soap*, *Hogs-Greaſe* and *Pitch*, of each a little quantity; mix and boyl them well together, and apply it warm to the Grief.

The Farcy.

TAke a handful of *Rice* and ten Cloves of *Garlick*, beat them together; then take a pennyworth of *Aquavitæ*, and ſtrain them through a Cloth; then take a little *Black-Wool* to drink up the Moiſture, and put into each *Ear* half the *Wool*, and ſew up the *Ears* together; then cut his *Forehead* and put into the Hole the inner Rind of an *Elder-ſtick* about an Inch long, and keep him in the Houſe that no Wet fall into his *Ears* the firſt day and night.

For any Farcy, Mang, Scab or Leproſie.

LEt Blood, then take a Quart of *Wine* or *Vinegar*, put therein a quarter of a Pound of good *Tobacco*; then ſet it on an *Ember-fire* to ſimper, and not boyl, for a whole Night; then ſtrain it, and with this *Water* waſh the infected place, as often as occaſion requires, until it is cured.

To help a Horſe that Galls between the Legs, through Heat or ill Dreſſing.

TAke a raw *Egg*, cruſh it between his *Legs*, rubbing the galled place very well therewith after the *Sores* are made dry.

For a Canker in a Horſes Mouth.

TAke half a Pint of the beſt *White-Wine Vinegar*, half a Pound of *Roach Alom*, and a handful of *Sage*; boyl theſe together, and therewith waſh his *Mouth* and *Tongue*.

For a Horſe that has got an Over-reach, or Tread of the Heel.

FIrſt, Search it well to the bottom, take out all the Gravel and waſh it with *Piſs*; then take a good handful of *Nettles* and a good handful of *Salt*, put them in a Cloth and bind them to the *Sore*; this do two or three Mornings together, then ſet on the *Shoe* with a Leather under it; which done, pour in ſome *Hogs-Greaſe* ſcalding hot, then ſome *Rozin* alſo ſcalding hot, and then after that put in ſome *Wheat-Bran*.

To draw out a Nail or Thorn in any place.

TAke *Houſe-Snails* and ſeeth them in *Butter*, and apply it for uſe.

For a Stub, or other hurt in or about the Foot.

TAke *Bees-Wax*, *Pitch*, *Hogs-Greaſe* and *Turpentine*, boyl them together in an Earthen *Pipkin*; but put in the *Turpentine* a little before you take it off the Fire; ſtirring it well together; then make the Wound clean and pour it in ſcalding hot; then dip *Tow* in it, and ſtuff the Sore place full of it, and it will heal in a ſhort time.

To kill Lice.

TAke the Juice of *Beets* and *Staveacre* beaten together, and therewith anoint his Body all over, and it will kill them.

Alſo to anoint him with *Hogs Greaſe* under the *Mane*, and upon the Ridge-bone of the *Back*, will deſtroy them.

For a Prick in the Foot.

FIrſt, Take off the *Shoe*; and pare his *Hoof* to find out the bottom of the *Wound*; then take *Turpentine*, freſh *Butter*, and a little black *Pitch* boyled together, and pour it into the Wound ſcalding hot; then dip ſome *Tow* in the ſame, and ſtuff it well between the *Shoe* and the *Foot*, ſplintering and binding it about with *Sticks* and *Leather* to keep it on; but if it be a long Nail that ſtruck into his Foot on the *Road* in a Journey; then pluck out the *Nail*, heat it red hot, and put it into the Hole as far as it went in; and having thus ſeared it with the *Nail*, to keep it from feſtring, melt *freſh Butter* and *Turpentine* with a little *black-Pitch*, and pour into the Hole as aforeſaid; then clap on the *Shoe*, and ſtuff the *Foot* with *Tow*, as before directed.

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A green Oyntment to heal a Wound.

TAke *Water-betony*, *Comfry*, *Red Sage*, *Jerusalem Sage*, *Mugwort*, *Rue*, *Southernwood*, and *Rosemary*, of each a handful, Boil them in a Pint of *May-Butter*, with as much *Mutton-Suet*, and when it hath Boiled a while, take it off the Fire, Strain it through a Cloath, and so put it into a Pot for your use. But before you lay on the Oyntment, wash the Wound with this following Water.

Take Half a Pound of *Bole-Armoniack*, a Quarter of a pound of White *Copperas*, and two Ounces of *Roch-Allom*, beat the *Copperas* and *Allom*, and put them into a *Pipkin* to melt on the Fire; when it is cold, put it with the *Bole-Armoniack* into a *Mortar*, and beat them together to a Powder; then take two Quarts of *Spring* Water, set it over the Fire close covered till it be Scalding hot, then put it into a clean Earthen *Pitcher*, to which put two Spoonfuls of the said Powder, and stir it well together before you let it settle; then when it hath stood two or three days setling, take off the uppermost froth, and gently pour out the Water into another *Pitcher* clean from the Dregs. And so it is fit for use, always using it as warm as can be endured; and when you wash the Wound, let the Cloth lye on a while, then wet a double Cloth in the said Water, and lay it on the Sore, renewing it two or three times a day, and after it is washt, lay on the aforesaid *Oyntment*. This Water is very good for any Wound old or new.

For a Sore Back, or Navell-Gall.

TAke a Quarter of a Pint of *Train-Oyl*, and Boil in it as much beaten *Verdigrease* as the quantity of a *Nutmeg*, put it into a *Pot*, and keep it for use.

For a new Wound made by a Stake, or Stub.

WAsh the Wound well with *Vinegar* and *Butter* melted together, then take a Clout tyed to the end of a *Stick*, which dip in some *Linseed-Oyl*, and run it to the bottom of the Wound, anointing it well; and in a short time it will be Cured; And if the Air gets in the Wound, and causeth it to swell, then anoint it with Oyl of *Popu'eon* round about the Swelling.

Train-Oyl, and *Verdigrease* melted together, will Heal and Skin any Wound in a short time.

For Horses Yard that's foul and furr'd without, that he pisseth in the Cod.

TAke Fresh *Butter* and *White-wine-vinegar*, melt them, then pull out his *Yard*, taking off the Filth, and wash it with the *Butter* and *Vinegar* until it be clean, and eject some of it with a Syring up into his *Yard*.

A help for a tyred Horse.

IF your Horse is tired in your *Journey*, or in a *Hunting Match*, give him warm Urin to Drink, and let him Blood in the Mouth, suffering him to swallow it; and if you come where *Nettles* are, rub his *Mouth*, and *Sheath* well therewith, and ride him gently; and when you come to your *Inn* or *Journies* end, let him be set up warm, and before your going to Bed give him about six Spoonfuls of *Aquavitæ*, and as much *Provender* as he will eat; the next Morning rub his Legs with Sheeps-feet-Oyl, and he will be recovered of his tiredness.

For the Glanders.

TAke a Quart of Red *Vinegar*, but not Wine-Vinegar, set it over the Fire, and put therein two Spoonfuls of *English Honey*, and as much *Elecampane*, beaten to Powder finely searsed, and as much *Roch-Allom*, as the bigness of an Egg, also beaten to fine Powder; and when all these are well Boiled, put in half a Pint of Sallet Oyl, then take it off, and let it stand until it is luke warm; and of this give your Horse six Spoonfuls in each Nostril, with a little *Horn*; then ride him out two or three turns, and tye his Head down to his Foot, for about four Hours, and let him fast as long. You must give this Drink at nine several times, being three days betwixt every Drink; every second day after he hath had his Drink, give him Chickens Guts warm rolled in beaten Bay-Salt, and put them down his Throat, giving him warm Water, and wet Hay all the time you give him this Drink, and this will amend the *Glanders*, and the Mourning in the *Chine*.

For a Cold, that is not the Glanders.

TAke two Spoonfuls of Pepper well beaten, the like quantity of *Mustard*, four Spoonfuls of *Sallet-Oyl*, four *Onions* roasted very soft and cut small; then take two Spoonfuls of *Elecampane* beaten into fine Powder, mix all these together, and make them into *Balls* with Fresh *Butter*, and give him them three at a time; and nine Balls so given him at three times will Cure him, so that you may Travel him upon it.

Another for a Cold.

TAke new *Butter* unwasht without Salt mixt in it, with brown *Sugar-Candy*, *Annifeeds* and *Liquorice*, but if the Horse rattles in the Head, put in two Cloves of *Garlick* made in *Balls*, and this give him for three Mornings together.

Balls

Balls for the Glanders, that Cures also a Cold, prevents heavy Sickness, purgeth away all Molten Grease, recovers a loose Stomach, keeps the Heart from fainting with Exercise, and makes a lean Horse soon fat.

TAke *Annifeeds*, *Cumminseeds*, *Fenugreek-Seeds*, *Elecampane-roots*, of each two Ounces finely beaten and searsed, then add to them two Ounces of Brown-Sugar-Candy finely beaten, and the like quantity of the Flower of *Brimstone*; then take an Ounce of the Juice of *Liquorice*, and dissolve it on the Fire in half a Pint of White-Wine, then take an Ounce of the best *Chimical Oyl* of *Annifeeds*, and three Ounces of *Syrup* of *Colts-Foot*; which done, take half a Pint of *Sallet Oyl*, the like quantity of pure Honey, and *Syrup* of *Molasses*; mix all this with the former Powders, and with as much Fine Wheat-Flower as will bind them together, to work into a stiff Past; and so keep them for use in a close Gally Pot, and when you have occasion for any, take some of the Past, and make it into Balls, about the bigness of a small Egg.

For the use of these *Balls* they are excellent for several occasions. If you use them to cure the *Glanders*, or a *Cold*, take one of these *Balls*, anoint it all over with Sweet *Butter*, and so give it your *Horse* in the Morning fasting; then ride him a little after, and feed and water him as you are accustomed to do, and this observe for a Week together. If you use these *Balls* to prevent Sickness, use them in the same manner for three or four days. If you use them to fatten your *Horse*, then give them for about a Fortnight together. But if you use them in the nature of a Scouring to take away *Grease* or *Foulness*, then after his Heat, and in his Heat you must use them. Also if you dissolve the *Ball* in his usual Water made *lake-warm*, it worketh the like effect, and fattens very much. If you give your *Horse* one of these *Balls* before a *Journey*, it prevents tiring: To give it in the height of Travel doth refresh Weariness, and to give it after Travel prevents *Surfeits* and inward *Sickness*.

A Water for Sore Eyes.

TAke a Pint of *Snow Water*, and dissolve it into three or four Drams of *white Vitriol*, and wash his Eyes therewith, or ofner until cured.

For a Pin, Pearl, Web, or any Film in the Eye.

TAke a new-laid *Egg*, roast it very hard, cleave it in sunder long-ways and take out the *Yolk*; then fill the empty Holes with *white Vitriol* finely beaten, and so close the Egg again; then roast it the second time until the *Vitriol* is melted; lastly beat the *Egg-shell* and all in a Dish, strain it, and with the Moisture that comes from it dress the Eye.

For a Bite, or Stroak in the Eye.

TAke a little *Honey* with a little grated *Ginger*, mix them together, and put it into his Eye with a *Feather*; do this three Mornings together.

To take a Film off the Eye.

TAke as much *Dialthæa* as the bigness of a *Walnut*, and put thereto the Powder of *Verdigrease* as much as a *Hazle-nut*; mix them well together, and every day put into his *Eye* as much of it as the bigness of a *Pease*, and this will take off the *Film*.

For a Canker in the Tongue.

TAke as much *Roach-Allom* as the quantity of an *Egg*, boyl it in three or four Spoonfuls of *Whitewine-Vinegar*, with a Spoonful of *Honey* and an handful of *Columbine-Leaves* cut small; with this wash his *Tongue* once a day until it be cured, which will be in a few days. For the washing his Mouth tye a Rag about a *Stick*.

To make a Star or any other Mark in a Horses Forehead, or any other part.

FIrst, With a pair of *Scizars* clip away the Hair close to the Skin, where you would have the Mark to be; then take a piece of *Brick*, or a *Pumice-Stone*, rubbing it hard all over until it is bare, and so wipe it clean. Then make a Plaister of *Burgundy-Pitch*, which must be just the bigness of the *Mark*; and a little before you put it on, lay a hot *Iron* upon the *Pitch* to soften it, to make it stick on the better; and so clap it to the place as a Plaister fit for the *Mark*, and lay a hot *Iron* on the back of the Plaister to heat it; then over the first *Plaister* lay another *Plaister* a little broader, heating the second as you did the first, and so let it stick on until it come off it self, which may be in about a Month. When these *Plaisters* come off, then to make the Hair come *White* where the Mark must be, take a little *Hony* and *Butter* (but more *Hony*) mix them together, and anoint the place therewith once in three days; and this do for about four or five times or days, and in about three Months the Mark will be perfect, and the Hair grown.

Many more are the *Diseases* and *Maladies* of *Horses*, and for every Disease there is abundance of *Medicines*, so that should I insert them all, it would take up a Volume it self. I have here taken notice of the most frequent Distempers, with Directions for their Cures, referring you to the many Books now extant, that only treat thereof.

A

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HAWK-

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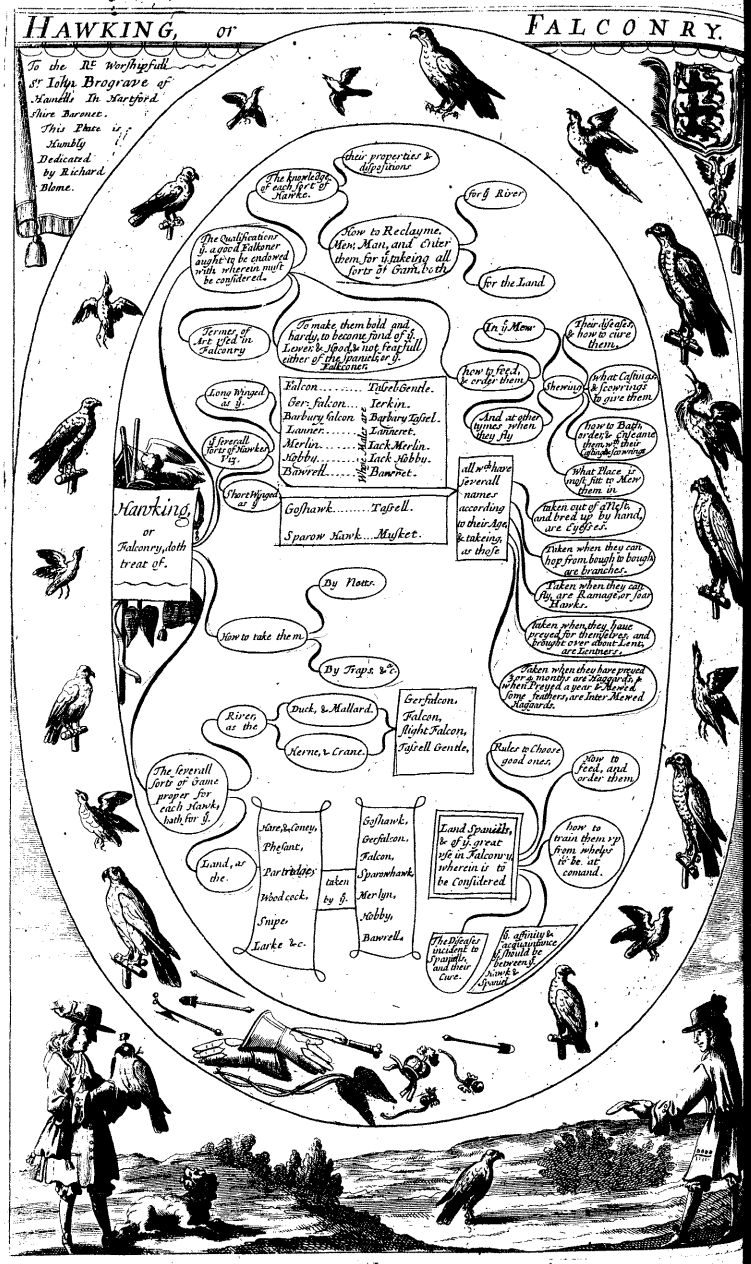
HAWKING, or FALCONRY.
To the Rt Worshipfull Sr John Brograve of Hamells In Hartford Shire Baronet. This Plate is Humbly Dedicated by Richard Blome.
Hawking or Falconry, doth treat of.
their properties & dispositions
The knowledge of each sort & Hawke.
for ye River
The Qualifications y. a good Falkoner aught to be endowed with wherein must be considered.
How to Reclaime, Man, and Enter them for ye taking all sorts of Game both
for the Land
Termes of Art used in Falconry
To make them bold and hardy, to become fond of y. Lewre & Hood & not fearfull either of the Spaniel or y. Falkoner.
In ye Mew
Their diseases & how to cure them.
how to feed & order them
Themselves
What Castings & Scourings to give them.
And at other times when they fly
How to Bath, Order & Cleanse them, & their Cloths Lawning
Long Winged as y.
Falcon ..... Tiercel Gentle.
Ger-falcon ... Jerkin.
Barbary falcon. as Barbary Tassel.
Lanner ..... Lanneret.
Merlin ..... Jack Merlin.
Hobby ..... Jack Hobby.
Bawrell ..... Bawrel.
If severall sorts of Hawkes Vig.
What Place most fit to Mew them in
all wch have severall names according to their Age & taking, as those
Short Winged as y.
Goshawk ..... Tassell.
Sparow Hawk .... Musket.
taken out of ye Nest, and bred up by hand, are Eyasses.
Taken when they cast hop from bough to bough are branchers.
Taken when they can fly, are Ramage or foal Hawks.
By Nets.
How to take them.
By Traps &c.
taken when they have prayed 3 or 4 months are Haggards, & when Prayed a year & More & some feathers are Inter Mewed Haggards.
Gerfalcon, Falcon, Flight Falcon, Tassell Gentle,
River, as the
Duck, & Mallard.
Herne, & Crane.
Rules to Choose good ones.
How to feed, and order them.
The severall sorts of Game proper for each Hawk, hath for y.
Land, as the
Hare, & Coney, Pheasant, Partridges, Wood cock, Snipe, Larke &c.
taken by y.
Goshawk, Gerfalcon, Falcon, Sparrowhawk, Merlyn, Hobby, Bawrell.
Land Spaniells, & of y. great use in Falconry, wherein it is to be Considered.
how to train them up from whelps & to their command.
The Diseases incident to Spaniells, and their Cure.
Ye affinity & Contrariety it should be between y. Hawk & Spaniell.

HAWKING AND FAULCONRY.

PART II.

Wherein is treated of the several kinds of Hawks *now in use, with their* Natures *and* Qualities. *The manner of* Reclaiming, Mewing, *and* Flying *them for the respective* Game, *proper for each* Hawk, *with directions for* feeding *and* ordering *them. Their* Diseases *and* Cures. *With a short Discourse of the* Spaniel, *shewing his use in* Faulconry; *with Directions for the* Breeding, Ordering *and* Managing *him for the* Game: *Together with Directions for the* choosing, ordering, *and* making *a* Setting Dog.

CHAP. I.

The Introduction.

ANcient Authors, such as *Aristotle* and *Pliny*, make no mention of this Noble Art, from whence we may probably conjecture it was unknown unto them of that Age, else without doubt we should have met with some Tracts thereof amongst other things of Antiquity. 'Tis true, many of them tell us that the *Eagle* is a Bird of Prey, but none of them have observed that this fierce and courageous Prince of the Air was ever reclaimed by the Art of Man.

In the Creation all *Creatures* were willingly subject to our first *Parents*; but since, it is by constraint, if they obey us, and not without great trouble mixt with frequent danger. Of this there is no clearer demonstration than this *Art* of *Hawking*, by means whereof a *Bird*, that by nature is wild, strong, swift, and cruel, is brought tame and tractable, insomuch that when she is at her own liberty soaring in the Air, yet such is her loyalty and obedience to her Master, that at his hollow, or signal of the *Lure*, she descends and comes to his *fist*.

In our *Age* this *Art* is arrived to its Perfection, but hitherto what hath been treated of it has been very erroneous.

The *Greeks* and *Latins* finding the *Faulcon* of all other Birds of Prey, the most adventurous, hardy, and yet tractable, did communicate her name to all others. The one calling *Hawks* by the name of *Jerax*, and the others by that of *Accipiter*. The *French* have imitated them, and we the *French*, and hence it comes that this *Art* hath its denomination of *Faulconry*.

CHAP. II.

Of the several sorts of Hawks.

THey who have wrote of this *Art* have divided the several sorts of *Hawks* after a various manner; some assigning ten sorts, others eight or nine, and others but seven. In this Treatise I shall speak of those in use amongst us in this Kingdom, which are the best for any *Game*, either for *River* or *Land*.

These *Hawks* may be comprehended under these two general Heads, *viz. Long-winged Hawks*,

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and *Short-winged Hawks*; and the rather for that all *Long-winged Hawks* require much of the same *reclaiming*, *manning*, *feeding* and *mewing* the one as the other: the like doth those that are *Short-winged*, which differeth much from the *Long-winged*. The *Long-winged Hawks* are the *Faulcon*, or *Slight-Faulcon*, the *Gerfaulcon*, *Lanner*, *Bawrel*, *Merlin* and *Hobby*.

The *Short-winged* are the *Goshawk* and the *Sparrow-hawk*.

And note that all *Long-winged Hawks* are brought to the *Lure*, and *Short-winged* ones to the *hand*.

All these *Hawks* have their *Males* or *Tassels*, which are nothing near so strong, large and fit for Service; yet are they of very good courage, and serviceable, especially the *Jerkin*, *Tassel Gentle*, and *Tassel* of a *Goshawk*, and sometimes surpasses the *Females*. And these *Tassels* have names appropriate to them; *viz.* The

Gerfaulcon, her *Jerkin*.
Faulcon or *Slight-Faulcon*, her *Tassel Gentle*.
Lanner, her *Lanneret*.
Merlin, her *Jack Merlin*.
Hobby, her *Jack Hobby*.
Bawrel, her *Bawret*.
Castrell, her *Jack Castrell*
Goshawk, her *Tassel of the Goshawk*.
Sparrow-hawk, her *Musket*.

All these *Hawks* have these Names, *viz.* *Eyesses*, *Branchers*, *Ramage* or *Soar-Hawks*, *Lentiners*, *Haggards*, and *Entermewed Haggards*.

She is called an *Eyess*, for being taken out of the *Nest* and bred up by hand in a Room. There is another *Eyess*, and that is also taken out of the *Nest*, but bred up at *Hack*, that is, by bringing her up, and to let her fly at pleasure, observing a certain place to feed her at, making there a *Nest* for her; and this sort so bred up is called a *Tackler* or *Hack-Hawk*, which generally proves the best.

She is called a *Brancher*, being taken when she is but able to hop from Bough to Bough: And this Term properly belongs to *Short-winged Hawks*.

When she can flee and prey for her self, then she is a *Ramage* or *Soar-Hawk*.

A *Soar-Hawk* taken about *Lent* following, is properly called a *Lentiner*, but being taken in hot weather generally is short liv'd.

If taken after *Lent*, she is properly called a *Haggard*; and when she hath preyed for her self a year, and hath mewed most of her Feathers, she is called an *Intermewed Haggard*.

There are other names to be observed for *Hawks*, *viz.* the first year she is a *Soar* or *Ramage Hawk*; the second an *Intermewer*; the third a *White Hawk*, then a *Hawk* of the first *Coat*, and every year a *Hawk* of such a *Coat*, as the second, third, fourth, or the like, so long as she liveth.

The *Male* of an *Eyess*, is an *Eyess Tassel*; of a *Brancher*, a *Brancher Tassel*; of a *Lentiner*, a *Lentiner Tassel*; of the *Soar* or *Ramage-Hawk*, the *Soar Tassel*; and of a *Haggard*, the *Haggard Tassel*.

According to these diversity of names and times a *Hawk* is to be esteemed; for by how much the later you take her, by so much the more difficult will she be to be *reclaimed* and *manned*, as being the more *Haggardly*, or wilder of Nature, but being well *manned*, doth make the best *Hawk* for the Field.

An *Eyrie* of *Hawks* consists of sometimes more, sometimes less, four or five being a good *Eyrie*, and seldom more.

The *Males* of *Hawks* are to be observed; the first year they are of a *reddish Plume*, after they have *mewed* they are *blewish*, and the older they are the blewer and whiter is the *Male*; and 'tis observed, that the *white Male* proves the best conditioned; the *dark maled* is brave metled, but subject to *Crowing*, that is, to fly at *Crows*.

The earlier a *Hawk* is hatched in the year, the redder, brisker and livelier will her eyes be, (which is her excellency, and sheweth a good *Hawk*) and one to be in health; for when she is sick her eyes will be pale and wan.

Thus having given some general Heads of the several sorts of *Hawks* now in use amongst us, in the next place I shall treat of each *Hawk* apart; and first with *Long-winged Hawks*, and then the *Gerfaulcon* requires the first place.

CHAP. III.

The GERFAULCON.

This *Hawk* is much larger then any other *Faulcon*, and thence it is that they have sometimes been esteemed a peculiar kind of *Bird*, not comprehended under the general Name of a *Faulcon*; and for her largeness, some esteem her to be a kind of *Eagle*. She is very fierce and hot, which causeth her to be so hard to be *reclaimed*, so that her *Keeper* had need be endowed with patience, and to treat her gently; but being overcome she proves an excellent *Hawk*, and will scarce refuse to fly at any *Game*, as the *Hern* and *River Fowl*; but her largeness is such, that it frights the Fowl which are in these parts, which hinders her killing her Game, and therefore is not esteemed so useful as the *Haggard Faulcon*, or *Ramage Faulcon*.

She is a stately *Bird* to behold, and most fit for *Princes* and Persons of *Quality*. Her Head and Eyes are like the *Haggard Faulcons*, with a large bending *Beak* somewhat blewish, her *Wings* are shorter than the *Slight Faulcon*; she hath large *Nares*, and a *Maile* like a *Lanners*; her *Feet* are large, and strong armed, and her *Traine* is much like the *Lanners*.

In going up to her *Gate* she is much of the nature of the *Merlin*, not using the same way as other *Faulcons*, for they climb up upon the *Train* when they find any *Fowl*, and as soon as they have got above it, they make several throughs or down-shoots till they have killed or bound it; and after she hath killed her *Game*, reward her as you do the *Faulcon*, which shall be next treated of.

Her

Her *Keeper* had need have a great care how to make her at first (as indeed all other *Hawks*) for being well made she will keep so; therefore be not too over-hasty in your *manning* and *reclaiming* her, but use a gentle and familiar way.

If you intend her for the *Brook*, *Lure* her as you do the *Faulcon*, and also feed her so, unless she be a slack metled *Hawk*, and then her *meat* must be wash't, and *Stones* often given her, and *Tyrings* constantly when she is empty, keeping her warm after it.

When you have brought her forward, give her often *Castings* to cleanse and purge her, as also to prevent the growth of too much glut and fatness in her inward Parts, which will endanger her life, which is but short at the best) unless in very skilful hands, which, together with the great trouble and charges in keeping her, makes it that she is in so little use amongst the *Gentry*, and the rather for that the *Haggard Faulcon* doth perform the same, and better, unless it be at the *Hern* or *Kyte*, for which Flights the *Gerfaulcon* and *Jerkin* are only fit.

CHAP. IV.

Of the FAULCON, or SLIGHT FAULCON.

The *Faulcon* or *Slight Faulcon*, is of several shapes, *viz.* some large, some small, others long shaped, and some round trust; so are they also of several *Mailes*, as *white*, *black*, *brown*, and *russet*.

The principal sorts of *Faulcons* are by all agreed to be the *Intermewed Haggard*, and the *Lentiner Faulcon* now much in use.

Those that are excellent are thus shaped, *viz.* broad shouldred, carrying her breadth down to her *Train* wide and strong, with short *Arms* and a large *Foot*, a short *Beak* and a large *Nare*, and close *plumed*, high *Thighs* with white on the insides, great full black *Eyes*, a large *breast*, her Head plumed dark or black with a white Wreath. In her Flight she is known from another *Hawk* by her nimble and quick getting up to her Place, by her strong stirring, and by her skill in her stooping and killing her *Game*.

She is very bold and hardy, of a great strength and courage to endure both *wind* and *weather*, gaining her Prey by main *Wing*, and into what place she cometh she is victor. By nature she is very hot, and consequently the better able to endure cold weather, witness her high soaring in the *Air*; and likewise when once she begins to cast her Feathers, she *meweth* with more expedition. Her greatest fault is, she is more difficult to be *reclaimed* then any other *Hawk*.

From this *Bird* the *Faulconer* is said to derive his Name, as well as the *Art* it self; for that it seems the chief end of a *Faulconer*, and the *Art* of *Faulconry* is rightly to *reclaim* and *man* the *Faulcon*; for she fleeth at all *Games*, both at *Field* and *River*, but most proper for the River: So that he that throughly understands how to bring the *Faulcon* to that Perfection that she is capable of, may well deserve the Name of a *Master* of this *Art*.

This *Hawk* is a great pains taker, no Weather discouraging her from her *Game*, if possible to be found; and although she hath laboured two or three days together in ill weather, yet she will not be tired; and indeed every *Hawk* requireth exercise: But old *staunch Hawks* should have more rest.

There is a pretty way for the flying at the *Kyte*, which affords good diversion; it is thus performed: Get an *Owl*, and tye a small *Fox* tail or some such device to one of her Legs, that she may not give you the Go by, and being in the *Field*, the day being warm and clear, you will soon discover a *Kyte* cooling her self in the *Air*, then let your *Owl* fly, and the *Kyte* will not fail to make near her to gaze upon her, and when the *Kyte* is descended pretty near her, then let fly your *Hawk*, and the *Kyte* perceiving the surprize, doth endeavour to preserve her self by mounting up and winding the most she can. And here the Combat begins, but oft-times none can see where it ends, both mounting out of sight; but in the end the *Hawk* becomes Victor, and by main strength and courage beats down the *Kyte*, yet not without many turns and wrenches in the *Air*, to the great pleasure of the Spectators.

CHAP. V.

The LANNER.

This is a *Hawk* well known, and much used, being called a *Kitchin Hawk*, and that not improperly, as being able to make more Flights in a day then any other *Hawk*, except the *Goshawk*. She is both for the *River* and *Field*, but chiefly for the last for *Pheasant* and *Partridge*.

If she is excellent she should have her *Head* small, her *Beak* short, her *Feet* blewish with short *Tallons*, her *Feathers* before mixt with black and white, not traversed as the *Faulcons*, but with strait *spots* amongst the *Plumes*, and her *Neck* short and thick.

She is very easie to be manned, yet hard to be made a good *Hawk*, by reason of the slackness of her mettle; and he only can make her a good *Hawk* that can keep her *stomach* in good order.

She is thus known from other *Hawks*, she is of a more blackish colour, is less *armed* and *pounced*, and hath a lesser *Beak*.

The *Lanner* is less inclining to the *Cuck* than other *Long-winged* Hawks, and therefore most fit for a young *Faulconer*. She holds her *Perch* without *Baiting*, more constantly then any other *Hawk*.

If you flee with the *Lanner*, she must be kept very sharp.

She keeps her *Castings* long, therefore give her hard *Castings* made of *Tow*, and sometimes knots of *Wormwood*, and often *Stones*.

After

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After she hath flowen to *mark*, she will sit, or fly according to her mettle and nature; and for that reason she is very observant to the *Dogs*, giving great attention to their *questing*, and all to give her self a labour, and that she may kill at her ease and pleasure.

She is of a harsh and stubborn mettle, and wants neither courage nor strength in the Field, being wild, and yet, when under our keeping, will stand in need of all the Spurs that can be given her to make her do her business; so that her *Keeper* had need use all the care and gentleness he can towards her, more then towards any *Faulcon*. The *Eyesses* are indifferent gentle, but the *Haggards* surpass in wildness.

All the time of her *Luring*, the *Lure* should be garnish't with *hard wash't meat* only, and most of her *Rewards* should be Bits from her *Keepers hands*; and being of a hard and strong constitution, you are to use hard *wash't meats*, with *stones*, according to her temper.

She is exceedingly addicted to *carry*, and therefore the greater care ought to be had in restraining her from that vice, which may be thus prevented. When she is brought to know the *Lure*, you must *Lure* her only one at a time, she being subject to catch at another, and if you observe not this you hazard her spoiling; for when once she begins to know the *Lure*, she will settle her love on it with a greedy desire to hold it fast, and not to part with it; and from hence it is, that if you use it often, she will through fear of being deprived of it, endeavour to carry it from you.

You must be very careful of begetting a good acquaintance and familiarity betwixt her and the *Spaniels*, for she hath this coyness more then other *Hawks*, and therefore at first accustom her to few *Spaniels*, and such that are *staunch* and well beaten to the Field, and at good command; for should she at first take any offence at them, it is a hard matter to *reclaim* her from it.

The *Lanners* may be made to flee the *River*, but it will require great care, long training, and much skill and conduct; however she is capable of it; but then you must neither feed too hard, nor flee too much, either drawing her down from her wonted *gate* and high flying, although she were never so hard and able; you must therefore be careful to feed her well, and not to set too sharp an edge on her stomack when you design her for flying, for her Nature rather leads her to return to her *Keeper* for a *Reward*, then to take pains for it.

What hath been said of the *Lanner* may be said of the *Lanneret*, observing to keep her high and as full of flesh as you can; to do which rightly, you must give her due quantities of *Stones* and *Castlings*, lest she be overcome with glut and fat: But being well trained and made *in ward to the man*, she may be flown to the *River*, and being well *quarred*, proves a good Killer: But I hold she is best for the *Partridge* if you can throughly *reclaim* her from her aversion to the *Spaniels*.

In *Summer* the Weather being hot, you ought to feed so much the cleaner, and wash the harder. In *Winter* being cold, feed the better; and by this means you may hold an even hand over them.

CHAP. VI.

The MERLIN.

THis kind of *Hawk* is fit for *Ladies*, by reason of its smallness and fine shape, as also for its good Conditions; yet is it of a bold courage, being in all points like the *Gerfaulcon*, and must be kept after the same manner.

If she is well *manned*, *lured*, and *attended*, she will prove an excellent *Hawk*, being of a quick flight, and very bold and eager at her Game, which is the *Thrush*, *Blackbird*, *Quail*, *Lark*, and the like, also the *Partridge*, and will attack those larger then her self; and although she hath not the strength to hold the *Partridge*, yet with her great strength in her *Beak*, she will kill them, in which is her excellency.

Having made her to the *Lure*, and that she will patiently endure the *Hood*, then make her a *Train* with a *Partridge*, if she *foot* and *kill* it, *reward* her well, permitting her to take pleasure thereon; and being well entred this way, you may flee her at the wild *Partridge*, and be sure to reward her with it if she kill, cherishing her also with your *voice*, which is a great encouragement to her. If she proves not hardy at the first *Train*, try her with a second or third; and if she proves not good then, you may despair of her.

For the *manning* and *reclaiming* the *Merlin*, use the same ways and means as with *Faulcons*. But some are of Opinion that *Merlin's* cannot be *mewed*, and if they be, are seldom afterwards good; but Experience declares the contrary: For if they are hardy, and have flowen well in their *Soarage*, they have proved much better after their *mewing*.

It is usual to fly a *Cast* at a time, which is very pleasant; for the *Birds* are so terrified at the sight of them, that they choose rather to take shelter under the Horses legs, then to rely on their *wings*. And a *Cast* of *Merlins* makes excellent Sport for the *Snipe* in the Winter, being much like the flight of the *Hern* and the *Gerfaulcon*.

To order this flight aright, do thus; When your *Merlins* are throughly manned and made gentle, carry them into the *Field*, and having found a *Lark* or some small *Bird*, make loose their *Hoods*, and go as near as you can into the wind to the *Bird*, and as soon as the *Bird* riseth *unhood* them, and cast them off to flee, and when they have beaten down the *Game*, let them *feed* thereon for their *reward*. At first you must flee them with the most advantage you can, that they may not be over-wrought.

CHAP.

CHAP. VII.

The HOBBY.

THis *Hawk* next the *Merlin* is the least of all *Hawks*, yet had in good esteem, being observed to follow the *Falconer* and *Dogs* in the Field; and when she espies any *Lark* or other small *Bird*, she makes at them with great Courage, few escaping her.

As to her *Shape* and *Colour*, her *Legs* are yellow, her *Beak* blew, with the *Crinets* or small *Feathers* under her *Eyes* black; the top of her *Head* is like the *Falcons*, with two white *Seams* on her *Neck*, her Breast *Feathers* are for the most part brown, yet poudred with white Spots, her *Back*, *Train*, and *Wings* are blackish, her *Stretchers* and *Pounces* are large, in respect of her short *Legs*, and her *Wings* and *Sayls* are larger than any other *Hawk* of her bigness.

She is a *Hawk* of the *Lure*, and not of the *Fist* (as all Long *Winged Hawks* are) and is a high Flyer, very Nimble, bold and daring, and will attack a *Kite*, or *Crow*.

She affords very good diversion with *Nets* and *Spaniels*, which is thus done, cause your *Dogs* to range and beat about the Field, to Spring the *Larks*; but the poor *Birds* espying the *Hawk* Soaring aloft, dares not betake themselves to their *Wings*, thinking to lye close; and so you draw the *Nets* over and take them.

The *Hobby* lieth indifferent well on her *Wings*, and when she follows the *Spaniels* as they range about, will make divers turns on them, so that when the *Game* is Sprung, she may the more advantageously stoop from her *Wings*; and being well *Manned*, she serves for several sorts of *Game*.

The *Hobby* must be taught and trained in each particular like a *Falcon*; and observe not to flee her in the Heat of the Day, for then she is apt to *Soar* and be lost (although but for a time, being to be found again) but about two a Clock in the Afternoon begin to flee her; and so hold on till near Sun-set, and longer is not good, for fear of losing her; and if you order her according to the Directions given for the *Falcon*, she will make a *Hawk* of great delight, for you may flee her oftner, and when you can't any other.

She is often made to Flee the *Patridge* at the first Season of the Year, also the *Quail*, *Wheat-Ear*, and the like.

In plain *Champain Fields*, where great and tall Bushes grow, the *Hobby* will make abundance of *Stoopings* (which resting sometimes) and if the *Bushes* stand at some reasonable Distance, the *Birds* will be so terrified at the sight of her, as to suffer you almost to take them up with your Hand; but may easily kill them with a *Cross-Bow*. And thus they will do Seven or Eight times, making their *Stoopings* with Rest between, so that the Sport will last three or four Hours.

The *Eyes* *Hobby* is best for the *Mount*; and I hold this way the best for *Reclaiming* and preparing them. You must take her out of the *Nest* a little before she is able to stand on the side thereof; then provide some other *Nest* on any *Tree* in your *Garden* or *Orchard* about Seven or Eight Foot from the *Ground*; and there at set times feed her with Bits from the Sharp end of a Stick, and when she is able to stand stiff on her *Legs*, and to tug hard for her *Meat*, then teach her to come from thence by your Art, in *Lureing* and *Calling* her, though it be but a foot at first, and so by *Degrees* further and further, until she will come from the *Nest* to you as far as she can well hear you; and there must she attend on her *Wings*, until you take her in: When she is full *Summed*, she must have her *Jesses*, *Bewits* and *Bells*, with other usual *Ornaments* and *Dressings*; then must she be made acquainted with the *Hood*, and cariage on your Fist all day; She must be also accustomed to *Men*, *Horses*, and *Dogs*, and she must be trained with *Larks*, which had need be let loose with a great deal of Caution, that she perceive not they are let go from your Hand: Her first *Trains* should be let loose in a *Creance* of *Brown-thread*, and Mounted forty or fifty Foot High before you *unhood* her, three or four *Trains* thus killed will be a sufficient Introduction. When she is thus throughly made, you may Flee her at the *Lark* with Advantage of the *Wind*, and near approach, and afterwards you need not use so much care; for she will soon gain Strength, and understand her Business. At such times when you do not use nor Flee her, you need to look after her only at Feeding times, remembring to draw her by your *Lure* and *Voice*, at least a Quarter, if not Half a Mile from home; and there Feed and leave her, for when she hath once *Fed*, *Feaked*, and *Rejoyced*, she will soon find the way home, to the place where she was Bred, and Trained up. On Resting Days when she is *Gorged*, you may find her in the Heat of the Day *Flying* and *Soaring* aloft, whereby she becomes acquainted with the adjacent places, so that if you leave her three or four Miles from home with her *Prey* in her *Foot*, you need not fear her coming home after she hath eaten it, and rejoyced, as aforesaid; but you may not trust her thus longer than the beginning of *September*.

There are of the *Haggard Hobbies*, that are very cuning in their Flights, and will desire to be High-Flown on their *Wings*, that from thence they may Conquer their Prey with Advantage; and will hardly be provoked to go from the *Fist* to her place. When they fly not, their feeding should be clean wash't *Mutton*, or the like; they should also have *Stones* and *Castlings* duly given; and you must be careful of setting a right Edge on their *Stomacks*, when you Flee them; for they are in all respects according to their Capacity, as Bold and Hardy as any other *Hawk* whatsoever.

CHAP.

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CHAP. VIII.

The BAWREL.

THis *Hawk* for Largneſs and Shape, is ſomewhat like the *Lanner*, but hath a longer *Body* and *Sails*. She is generally a faſt goer aforehead, and a good *Field-Hawk*; and in Enclofures will kill a *Pheaſant*, but being a Longwinged *Hawk* is unfit for the *Coverts*.

CHAP. IX.

The CASTREL.

THis is a Sort of *Hawk*, which for Shape is is much like the *Lanner*, but for Size like the *Hobby*, her *Game* is the *Greuſe*, which is a Foul common in the North of *England*, alſo in *Windſor Foreſt*, and divers other places. She will kill a *Partridge*, but it is a *Hawk* of a very cowardly Nature, and a ſlow goer aforehead, and therefore not much in uſe.

CHAP. X.

The GOSHAWK.

THis is a *Short Winged Hawk*, whoſe nature and properties require different Management, that is, *Manning*, *Reclaiming* and *Mewing* from *Falcons* and other *Long Winged Hawks*. And of all *Hawks*, ſhe is doubtleſs the moſt Shie and Coy both towards the *Men* and *Dogs*, requiring more the Courtſhip of a *Miſtreſs*, than the Authority of a *Maſter*, being apt to remember any unkind and rough uſage; but being gently handled, will become very tractable, and kind to her Keeper; and may be brought from that Averſion ſhe hath to the *Spaniels*.

There are divers Sorts and Sizes of *Goshawks*, which are different in Goodneſs, force and hardineſs, according to the ſeveral *Countries* where they are Bred; but no place affords ſo good as thoſe of *Moſcovy*, *Norway*, and the North of *Ireland*, eſpecially in the County of *Tyrone*.

The moſt weighty are by many eſteemed the beſt, and for Colour the *White-Mail*; for generally they are bold, and yet not ſo wild, but that by little induſtry they may be *Reclaimed*; and thoſe of this Colour are for the moſt part ſtronger than others, and may be well made to Flee the *Hern*, or any ſuch ſtrong Bird.

As to the *Proportion* and *Shape* of a good *Goſhawk*, ſhe ſhould be thus made; To have a ſmall long Head, a ſhort *Beak*, a large *Throat*, her *Nares*, *Back*, and *Feet* large, a long *Neck*, big *Breaſt*, ſhort fleſhy *Thighs*, ſhort and ſharp black *Pounces* and *Tallons*, large *Feathers*, under her *Train* to be *Engouted*, that is to have black Spots, the *Train-Feathers* to be ſhort, and the *Covert-Feathers* of the *Train* Spotted with Black *Bars*, and of theſe the fewer the better.

The Signs to know when ſhe is in Health, is her *Pounces*, which will be Black, and her *Sear* and *Feet* well Guilded.

The *Goshawk* by nature is very Hardy, and catching for Prey, and withall very diſdainful, ſo that a Nice Hand muſt be kept over her, with conſtant carrying her Barefaced, with the *Perch* to be where People are frequent, and that ſhe take no Fright; ſo that they that deſire to keep her long, muſt uſe her gently, and be well adviſed when, and how to Flee her, leſt if ſhe miſs her *Prey* ſhe take Pet, and ſo make you wait upon her.

The *Goshawk* is very apt to take ſtand on any *Tree*, and when they diſcover their *Prey*, will quit the *Tree* with ſuch fierceneſs and ſtrength, that they ſeldom miſs their *Game*.

Your *Goshawk* being *Manned*, take her to the Field, and with a *Train-Partridge* embolden her, and let her *plume* thereon, which will make her more eager. If the *Partridge* chance to Spring, let her flee, and if ſhe kills it, *Reward* her: And if it happen that the *Spaniels* ſhould take it (as oft times high metled *Dogs* will do) then be ſure to take it ſpeedily from them, and caſt it out to your *Hawk*, crying *Ware Hawk*, *ware*, and let her feed thereon at pleaſure. Thus uſing her three or four times, if ſhe have any Mettle ſhe will doubtleſs become excellent for this ſport. But take notice that after you have thus *Rewarded* her with ſuch *bloody Meat* at fill, you muſt not fly her in at leaſt a day or two after; and at firſt enter her to the ſtrongeſt *Partridge* you can, for if you enter her on Young-ones it will make her lazy, and not care for long flights. If ſhe kill, Reward her therewith, and be ſure have a great care to keep her in good order; and if in caſe your *Hawk* (as being out of order) turn Tail, or give off the flight and take a *Tree*, call in your *Spaniels* to the *Retrieve* that way ſhe flew the *Partridge*, and let the *Faulconer* alſo draw himſelf that way, and being provided with a *Partridge*, let him caſt it out to her (but ſo that ſhe ſee it not) which will make her believe it is the ſame ſhe flew at, and when you caſt it out, cry *Ware Hawk*, *ware*; Then make her ſeize it, and let her feed thereon; and by this means ſhe will be encouraged to flee out her flight another time. If the next time you flee her (which muſt be after a day or two) ſhe ſerve you ſo again, then obſerve the aforeſaid Directions, and if ſhe yet retain her ill cuſtom, ſhe will not be worth the keeping.

Patridge

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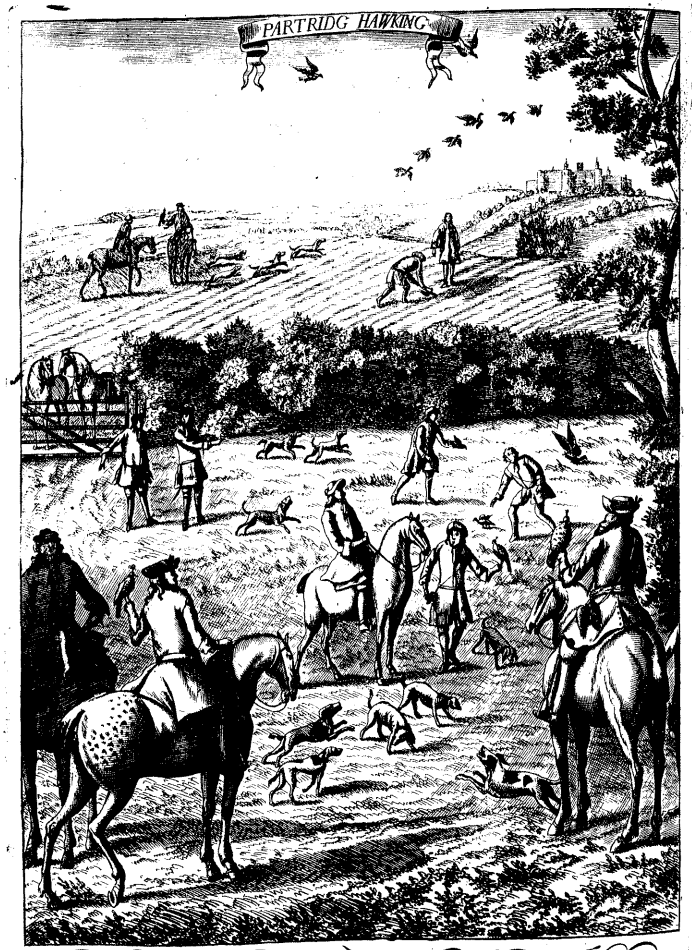

To the Worshipfull John Basſett of Heanton-Punchardon In Devon-Shire Esqr This Plate is humbly dedicated by Richard Blome

Partridge Hawking.

THis *Game* affords great Diverſion and Recreation, and attended with no ſmall profit; for I have been credibly informed by a Worthy Gentleman and an expert *Falconer*, Sir *Ralph Dutton*, that he hath killed in a Seaſon with one *Goshawk* an hundred Brace of *Partridges*.

For the taking them, your chief buſineſs is to be prepared with about four or five Couple of *Spaniels* that are good Rangers, and ſuch as will hunt at command in compaſs; whoſe motion you are to follow on *Horſe-back* with your *Hawk* on your Fiſt, ſo that you may be ready to caſt her off upon their ſpringing any. And when ſhe hath killed it, for her *Reward* obſerve the aforeſaid Directions.

It is now the Mode to go into the Field with a Caſt or two of *Hawks*, and about ſix or ſeven Couple of good ranging *Spaniels*, and when a *Covey* is *ſprung*, to caſt them all off at a time, which affords good diverſion to the Spectators. But in the Opinion of ſome, this way is not approved of, as being deſigned rather to go out to kill what they can, than only for the Sport.

The *Falcons* and other long Winged *Hawks* being flown at the Field, if they kill not their Game in the *foot* the firſt flight, are taught by nature to climb up and mount aloft upon the *Mark* for their advantage, and to the end they may kill at their *ſtooping*; ſome indeed will truſt to their own ſwiftneſs and maſter their *Prey* at the ſtretch: So alſo the *Goshawk* through her ſwift flying doth at her pleaſure maſter her *Prey*, whereas thoſe others that are ſlugs and ſlow of flight do win what they get by Policy, watching their advantages, wherein their *Keeper* ought to aſſiſt them.

The *Goshawk* in the time of her fulneſs and pride will not without very gentle uſage be brought conformable in any meaſure to her *Keepers* Will, but when ſhe comes to be *Enſeamed* and made ready for the purpoſe is exceeding prone to *Bate*, and conſequently to throw her ſelf into ſeveral Diſtempers which ſhortens her days. To prevent this and many inconveniencies, you ought by your utmoſt diligence to make her *Inwards* and loving to you.

As for *Cold Meat*, it matters not much whether you waſh it or not, for the Blood being cold for a day or two hath loſt its vigour; but uſe not cold *Meat* long, for that breeds many *Diſeaſes*. When you go into the Fields to flee, take a *Meals Meat* well waſht and clean dryed, and after ſhe hath Caſt in the Morning, give her a bit or two as ſhe is *hooded*; and if you flee her not in about an hour after give her another bit, and ſo afterwards according to your diſcretion to keep her Stomach ſharp, and yet to prevent Wind, whereunto all *Hawks* are ſubject.

When you ſet her to the *Perch* Hood her, and indeed your *Fiſt* for the moſt part ſhould be her *Perch* until ſhe is throughly *Reclaimed* and well flown; for in her making a little reſt will cauſe her to return to her firſt Ramageneſs, and to forget what you have taught her.

Whilſt you are *Making*, *Enſeaming* and *Reclaiming* her, feed her often, and but a little at a time, and not with ſet *Meals*, and give her often *Tiring* upon a ſweet *Rump* of *Beef*, or the *Pinions* of the *Wings* of a *Fowl*, which will keep her *Head* clear, and quicken her *Stomach*; for when once ſhe is full, ſhe hath no more love for you at that preſent; whereas if you keep her ſharp ſhe will be regardful of you, liſtning for your coming with joy and delight when ſhe hears your voice, for then ſhe expects ſomething from your welcom hands.

When you Enter her, put her on the higheſt pitch of hunger to prevent the worſt, and then you ſhall diſcover both her Mettle and Love; beſides you ſhall thereby prevent many inconveniences of *Frights* and *Sloth*, which attend an imperfect and dead *Stomach*.

Having ſhewed how to make your *Goshawk* for the *Land*, it will not be amiſs to give ſome Inſtructions how to make her for the *River*, for the *Hern*, *Wild-Goose*, *Duck*, *Teal*, &c. which is thus done. Firſt, Make her to the *Fiſt*, as is already preſcribed; then carry her without *Bells* and enter her with a live *Duck* tyed to a *Creance*, and ſo draw near it with your *Hawk* on your *Fiſt* unhooded, and then throw out the *Duck* and caſt off your *Hawk*, and if ſhe take it at the *Souſe*, let her be *Rewarded* and fed with a reaſonable *Gorge*; then take her up to your *Fiſt*, *hording* her, and giving her a *Leg* or *Wing* thereof to *plume* upon.

After this manner do two or three times with about three days reſpit between, and it will well enter her for the *Game*.

Directions for Keeping and Reclaiming a Goshawk; *as alſo how to Mew and draw her out of the Mew, and make her flying.*

THE chiefeſt Skill of a *Falconer* is to make his *Hawk* delight in her Flight, which is occaſioned by kind uſage; and therefore it happens that many *Goshawks* (as indeed other ſorts) that are good in their *Soarage*, become worſe after *Mewing*.

At the firſt entrance he ſhould be provided with a *Train-Partridge* in his *Bag* to Reward her on occaſions, to gain her love, and be ſure to keep her always in good order; and to that end obſerve, that all *Goshawks* are naturally full of all moiſt humors, eſpecially in their Heads, and therefore he ought to ply them with *Tiring* and *Pluming* Morning and Evening, to open their *Heads*, and occaſion them to caſt out Water thereat. A *Rump* of *Beef*, a *Pigeon*, or the *Leg* of a *Chicken* is very good to *plume* them.

You ſhould give her every Night *Caſtings* of *Feathers*, *Cotton*, *Linnen Threums*, a *Hares* or *Rabets-Foot*; and obſerve it in the Morning whether it is wrapped round or not, whether dry or moiſt, and of what colour the Water is that drops

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drops out of the *Casting*; for by these *signs* he may know the condition of his *Hawk*, for the cleaner the Water is, and the sweeter the *Casting*, the better she is in health; for if her *Castings* are clammy, she is not fit to be flown that day.

Her *Mewts* must also be observed, to see if they be clean or not, and prescribe *Remedies* accordingly. He must keep her clean, and her Feathers whole, and if any happen to be broken to *Imp* them, and if bruised to put them into Warm-Water to straiten; but if they happen to be in such a place that you can't put them into Water (as towards the *Plumage* or *Pinion*) then heat the Stemb or Stalk of a *Cabage* in Warm-Water, slit it and so lay it on the *Bent-feathers*, which will soon draw them strait. And a good *Falconer* should always be provided with his *Imping-Needles*, his *Semond*, and other *Instruments*. He should always keep her high and lusty, yet so that she may be in a condition for a flight.

If she chance to *Bath* her self in Cold Weather, after a flight (which sometimes she will do through the carelesness of the *Falconer*, in not letting her *Bath* her self) set her in the *Sun* and she will soon dry her self; but if it is *Rainy* or *Frosty-Weather*, then set her near a *Fire* with her Back towards it, and not her Gorge.

Goshawks by nature are addicted to *Poult*; that is, to kill *Poultrey*; and to bring them from that ill quality, set their *Perch* in some place where *Poultrey* comes to acquaint them therewith, by which means they will not be apt to fly at them, and the *Perch* should be lined with *Cotton* or *Canvass*; and in Warm-Weather she may be set for an hour or two in the Morning in the Sun-shine, and always observe never to set her near a *Wall*, to the end she may not hurt her Feathers when she *Baterh*.

It is requisite to fly the *Goshawk* the first Year to the *Field*, and not to the *Covert*, by which means she will learn to hold out, and not to turn Tail in the midst of her flight; For a *Mewed Hawk* is very tractable, and it is better for her to be a little *Ramage* than over-Manned.

If you design her for great *Fowl*, then make her Trains thereof, and do not fly her at less.

If you would have her to fly with *Dogs*, train her up with them, and *Reward* her with them to make her acquainted with them; but of this more in the *Chapter* of *Spaniels*.

In case she is in flying, and a great Killer, you may give her *bloody Rewards*, with *Suppers* of the same, or at least three times a *Week*; but not so in the time of Rest.

Concerning Castings.

AS for the *Castings* to give your *Goshawk*, I advise you neither to this or that in particular, but search out what agreeth with her best, and that use. Be sure to get her a good *Stomach* before you proffer her *Castings*, and let it be no more than what she can easily swallow; when once she hath taken it, give her a bit or two of *Meat* to please her at first putting on her *Hood*, in which she must sit until you find she hath put over her *Casting* into her *Pannel*. She will soon perceive what it is she is to do when you afterwards offer her any, if you *Reward* her kindly after her taking it. When once she hath put it into her *Pannel*, give her a reasonable *Supper*. I hold it not amiss to acquaint you with this Method at the beginning; but when once she is truly *Enseamed* give her her *Supper*, and when you are going to Bed, give her her *Casting* with a little bit of Meat. When she is in flying, give her *Plumage* every Night when you feed her up; but when she Rests, feed her at Night with very clean *Meat* without any *Casting*, and prepare a *Thrum* or *Hares-Foot Casting* of a reasonable size, not too big, and early in the Morning she will Cast; and then in half an hour you may give her a bit or two of Meat, and she will be fit to flee in the Afternoon.

Your own observation of the difference between the Complexions of *Castings* thus given, compared with those given upon a full Feeding, will soon convince you that the latter way is safe, and not unpleasing to your *Hawk*, as the other is. But if you will give *Castings* at Night, feed her not too full, and give her a little *Plumage* with it. If she dislikes *Castings* of *Thrum* (as many do) then give her those of a *Hares-Foot*, or *Coneys-Foot*, the *Bones* and *Fur* being well broken together.

How a Goshawk *ought to be called loose, and taught to draw, and in what places.*

FOR calling your *Goshawk* loose, that is to teach her to follow you from place to place, you must take her some distance from Home, and to such a place that is remote from a *Town* or *House* where *Poultrey* are, being great temptations to her; but the most convenient place is a young *Wood* or *Grove* solitarily seated, and having prepared her *Stomach* fit for the purpose, put her up into some *Tree*, walking some distance from her into the *Wind*, gently using your *Voice* as if you had *Spaniels* with you, to the end she may be the better invited to follow you, and if she doth, let her not be too long, but call her to your Fist, *Rewarding* her with a Bit or two of Meat, which you should have in a readiness in your *Bag*; Then put her up into a *Tree* again, and with a gentle and low *Voice* call her after you, as before directed, saying, *Come, Come.*

Pheasant Hawking; *Giving Directions how to enter a* Goshawk *to the* Covert *for* Pheasants.

THere is none can order and manage the *Goshawk* to the *Covert*, but such as are of a strong and able Body, with Spirit and Courage added thereto to follow her up and down; and having one so qualified observe these Directions, for this Flight is different from the *Champain-Fields*,

To the Right Worshipfull S: John Thorold of Marston in the County of Lincolne Baronet

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Fields, where the *Hawk* and *Game* is always in sight: For you are to make her to the *Pheasant*, and such like sort of *Fowl* that always frequent *Woods*, *Coverts*, and the like obscure places, which hinder your sight that should be your guide in the flight. And for the better effecting this, you must be very careful what place you first enter her in, to the end she may be well guarded and kept from taking any dislike or offence at the Dogs, which if she do at the first entrance, it will be difficult to bring her to endure them again: For the former familiarity betwixt her and the Dogs was bred in the *Field*, where she might see them before they came at her, and were prevented by the *Falconers* runing hastily into her, to occasion any such fright. Therefore to prevent any such ill quality at the first, she must be better *manned*, *followed*, and *governed* than in the Field; so that if you would have her made a perfect *Hawk*, and to be bold and venturous in thick *Woods* with the *Falconer*, the *Dogs* and the *Game*, you must make good choice of the *Time*, *Place*, and *Dogs*.

For the Time, it should be early in the Year, viz. about *January*, *February*, or *March*, which is before the Approach of the *Leaf*; but the best Months for *Pheasant Hawking*, are *November*, *December*, and *January*, after which time you must be preparing her for the *Mew*, that she may be early *Mewed*, to Fly at the Field the next Season for *Partridge*.

Having made good choise of the place to Fly your *Hawk* in, and that you have let her go unto her Flight; you must be sure to command your *Dogs* behind you, until you have found her; and if she hath killed the *Game*, it is sufficient, if not, but that you find her on the Ground out of an eagerness of the Sport (as many will be at first entrance) if there be any *Tree* that she may well see from it, set her thereon, otherwise keep her upon your *Fist*, and beat for it again; then if she Fly and kill it, keep back the *Dogs* until you have found her; and suffer her to *Plume*, and take her pleasure for a while, then call in your *Dogs* gently, and walk about her, encouraging her with your *Voice*, that she may be acquainted with the Noise; and when you see it convenient stoop to it on your Knees, and rending the *Chaps* give her Blood in the *Throat*, which will much please her. Also pare away the hard *Brain-pan* from the rest, and give her the *Head* in her Foot to eat, the Ground hiding from her the Body, and having your *Dogs* close by (which must be in great Command), when she has done, and begins to look about her, then throw the *Pheasant* amongst them that she may (together with some words of Rebuke from you) make them give way with fear unto her; but let them be in her sight, and having sufficiently taken her Pleasure, take the *Pheasant gently* from her, leaving the *Head* in her Foot, and let her eat it on the Ground, where the *Quarry* lay, only reserving a little to take her to your *Fist* withal; then put on her *Hood*, and *Reward* her according to the former Directions, which will much win her Love to you. And according to these Directions, with a good *Keeper*, *fair flying*, and two or three *staunch Spaniels*, in a short time she will be brought to good perfection.

For the emboldning your *Hawk* to make her take a *Pheasant* from the *Perch* with courage, observe these Directions: Before you slee her, provide a dead *Pheasant*, or one alive which is best, which take along with you into the *Wood*, and when you are disposed to call your *Hawk* for her *Supper*, and as she is drawing and attending after you for the same (having a convenient *Pole* ready for that purpose) call your *Spaniels* about you to make them *Bay*, and suddenly breaking the Neck of the *Pheasant*, lift it upon a *Bough* that the *Hawk* may have sight thereof, and with your *voice* calling and incouraging her to come in to seize it; and if she pulls it down, be sure that you so rebuke the *Dogs*, and keep them at command, that at her descending they give her way; and that she may plume, and take her pleasure thereon, which in a small time will so embolden her, that when she seeth a *Pheasant* take *Perch*, she will immediately seize it, and pull it down; nor will she be fearful of the *Dogs*; for when they are once *managed* and brought into good subjection, they will know their duty, and be fearful of transgressing, so that you may venture them if you were absent: But be sure you have no strange *Dogs*, for one may spoil your sport, drawing the rest into Errors, and cause them to hunt after any thing: Nor is it convenient to hunt with many *Spaniels*, for two or three Couple are enough to range and beat about a large *Wood*, and to *Perch* a *Pheasant*.

For Reclaiming and Ordering an Eyess Hawk.

YOU must be provided with some convenient cool *Room* that is Airy, with two *wicker* or *glass Lights* to let in the *Air*, and on the *Floor* for coolness strew fresh *Sand*, and place in the *Room* two or three great *Turfs* or *Sods* for her to set cool upon; you must also have two or three *Perches* lined, and one higher than another. When she is full *summed*, so that she can slee, then set a Pan of *Water* in the *Room* to *bathe* in, which must be shifted every two or three days; being not only very wholsom, but it will cause her to *Mew* or be full *summed* the sooner and better.

You must feed her with young *Pigeons*, *Sheeps-hearts*, and the like; and whilst she is young, her Meat should be cut in small *Pellets*, and be fed two or three times a day, according as you find her *endew* it, and put it over. When she is full *summed*, and slies about, you may give her *Pigeons*, feeding her sometimes on your *Fist*, permitting her to gripe and kill them in your hand. You may also put a live *Pigeon* into the *Room* where she is kept, which will the better teach her how to foot and kill them; and that she may be taken off from that ill quality of hiding her *Prey* after she hath seized it, which is customary to all *Eyesses*, let her feed in your Presence; and to make her the more bold and acquainted with you, go into the *Room* every Morning to call her to your *Fist*, whistling and using some incouraging ways as is

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accuſtomary, and that you would have her acquainted with.

When ſhe is full *ſummed*, and hath put forth all her *Feathers*, take her out of the *Room*, and furniſh her with a *Ruffer-hood*, as alſo with *Bells*, *Jeſſes* and *Bewets*: And to make her indure her *Hood*, put a *Brayle*, that is, a piece of *Leather* ſlit upon one of her *Wings* to tye it up, and then ſpout Water out of your mouth to wet her, and put her *Hood* on and off ſeveral times, which will teach her to take it gently. And to make her indure the *Hood* at firſt, you muſt have a *Ruffer-hood*, with which often *hood* and *unhood* her, ſtroaking her *Head* gently with your *Hand*, until ſhe will abide it; then in the Evening by *Candle-light* *unſeal* her, giving her ſomething to tyre upon, handling and ſtroaking her *Feathers*, as alſo *hooding* and *unhooding* her.

When your *Eyeſs* is well won to the *Hood*, and to the *Fiſt*, (which cuſtom will ſoon bring her to) let her kill *Birds* or *Pigeons* on your *Fiſt*; then for four or five days, or longer, (as occaſion requires) call her until ſhe will come to you at ſome diſtance; then take a live *Pigeon* tied by the foot with a *Creance*, which you muſt ſtir until ſhe Bates at it, and ſeizeth it; but this muſt be at a ſmall diſtance, leſt the *Pigeons* ſtrugling ſhould diſcourage her, until ſhe is well entred; therefore in ſuch caſe you ſhould aſſiſt her, and let her *plume* and *foot* it, ſuffering her to feed thereon, whiſtling and incouraging her: Then *hood* her, and let her *plume* and *tyre* a little. The day following call her to your *Fiſt*, ſhewing her a live *Pigeon* ſo near, that ſhe may reach it; then caſt it out before her, and let her flee and ſeize it, giving her a *Reward*. Again, throw out a *Chicken* before her, and if ſhe ſeize it, *reward* her well; and by this means uſing her to great *Trains*, ſhe will get courage, and will not fly away with them and hide them as if trained to ſmall *Birds*. But this is only for a *Sparrow-hawk*; for a *Goſhawk* muſt have no live thing given her in her Foot, from the time of her firſt entring, until ſhe hath killed ſomething by her own ſtrength: But if a *Goſhawk* be ſo cowardly as not to ſeize it, then take a live *Partridge*, make a hole in the Ground, and put the *Partridge* therein, covering it with a *Slat* or thin *Board*, and tye a String to it of about twenty Yards long, which you muſt hold in your hand to draw away as occaſion requires; then make as if you uncoupled your *Spaniels* to hunt, and put up the *Game*, and carry her *unhooded*; and when you perceive that ſhe looketh towards the place where the *Train* is, then draw off the *Slat* or *Board*, and cauſe the *Train* to ſpring as if by the *Spaniels*; and if ſhe take it, let her feed thereon her fill on the Ground: And this courſe do ſeveral times to make her perfect therein.

CHAP. XI.

The SPARROW-HAWK.

THis *Hawk* is much of the nature and reſemblance of the *Goſhawk*, but not of the *bigneſs*, and ſhe requires the ſame *feeding*, and maketh the ſame *flights*. It is a *Hawk* common in theſe *European Parts*, and thoſe are beſt eſteemed that are bred in cold, barren, and high places, where there is little or no *Game*, for thereby they are taught to be more laborious and induſtrious. The only reaſon I ſuppoſe why they are of ſo little eſteem, is their commonneſs and cheapneſs, for they are of great uſe and pleaſure; and he that hath once experienced a well *Reclaimed Sparrow-Hawk* will hardly be without one.

Their Game is young *Pratridges*, but their excellency is for *Magpies*, *Black-Birds* and the like ſmall Birds.

There are ſeveral Sorts of *Sparrow-Hawks*, and of different *Plumes*, juſt as there are of *Goshawks*, which is occaſioned through the diverſity of *Regions*, and *Countries* where they Breed, the larger are in moſt eſteem, and want nothing but ſtrength to match their Courage.

The *Marks* of a good and Beautiful *Sparrow-Hawk* are theſe, the *Head* little, the *Beak* thick, the *Legs* ſhort and Fattiſh, the *Pounces* ſharp and long, and of a ſad *Mule*, the *Eyes* full, the Circle about the Ball of the *Eyes* of a colour betwixt white and green, and the *Neck* Long and Thick.

I would adviſe all young Beginners in *Falconry*, to begin their practice on this *Hawk*, for thereby they may learn to manage others, eſpecially the *Goshawk*.

The *Sparrow-Hawk* ſhould not be Fled in the Morning, unleſs ſhe be prepared over Night with a ſhort and clean *Supper*, and you ſhould always have in a *Box* about you Freſh *Butter*, mixt with a little *Saffron* and *Sugar-Candy* to give her now and then with her *Meat*, which ſhe will eat with great delight; and this will keep her *Head* always looſe, and in good Temper; and it will alſo prevent the *Cray*, and keep her proud and full of Spirit.

They Mew *every year in* April, May, *and* June.

Sparrow-Hawks that are newly taken and will not Feed, rub their *Feet* with warm Fleſh, or with a live *Bird*, and put it to her *Beak*, and if ſhe Seize it, 'tis a ſign ſhe will Feed, and then tear off the *Skin* and *Feathers*, and put it to her *Beak*.

It is beſt to enter the *Sparrow-Hawk* in ſome *Champain Country*, far from *Woods*; and let her be *unhooded* when the *Spaniels* are uncoupled; then if the *Patridge* Spring near you, and ſhe *Bate*, let her go, and if ſhe kill, *Reward* her on the Ground with the *Head*, *Brains*, *Neck*, and *Breaſt* of

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To the Honorable Sr Richard Bar^t Created (by Letters Patents to Phillip now Ld Vis^t Wenman Baron of Dublin, in ye Kingdome of Ireland, in ye County of Gallway, in the said Wenman of Caswell in Oxfordshire comence, after the death of R^t Honble Wenman of Kilmainham in ye County as also Vis^t Wenman of Tuam, Kingdome.

This Plate is humbly dedicated by F Barlow delin: Richard Blome. A Soly fecit

of the *Partridge*; then when she hath fed take it away, and get on *Horse-Back* a pretty distance from her, whistle and call her; and if she come, *Reward* her well. And above all things have a great care that she fail not at her first Flight, which should be at larg *Partridges* called *Stubtayls*; lest always after she should turn Tail, when she Flies at strong ones.

There are several names or distinctions of *Partridges*; the first, when newly hatched are called *White-heads*, the second Names are *Chick-tayls*; the third *Stubtayls*, the fourth *Ruintayls*, and then they are full *summed* and hard set.

When you enter your *Sparrow-Hawk*, hold your hand aloft; that she may the better watch both the *Spaniels* and *Prey*: you must give her some small *Reward* after every Flight, especially if she kill; and if at first entring she miss, be sure to have some young *Partridge* or *Bird* in your *Bag*, for her to kill; after she is well entred and nousled, then hold down your *Fist*, whereas formerly you held it up. You should likewise be sure to let your *Spaniels* Range near together, and on your Right Hand, that she may the better discern her Game, and Flee to the most advantage; for which purpose you should be as near the *Dogs* as possible, and carry your Hand low, that she may not bear at the *Game* before they Spring. He that is not quick of sight, and nimble of Hand with his *Sparrow Hawk*, shall soon Spoil her, but with Care and due Attendance, there are few *Hawks* of more pleasure, for you may Flee her at such times of the Year, as you can't the *Goshawk*: Her keeping ought to be delicate, and in regard she is so small and weak, be sure to keep her High and Lusty; yet with due Regard to the preparation of her Stomack, before you take the Field with her. She will kill according to the several Seasons, Diversity of *Game*. She generally delights to Flee close to the Ground, and will stoutly attack the *Lap-Wing*, *Ring-Dove*, *Jay*, *Mag-Pye*, *Black-Bird*, and the like *Game*, and she may be made to hold out all the Summer.

You should Flee her from the *Hood*, and not to let her spend her little strength, and disorder her self by unruly *Bateing*, which happens by being carried Bare.

If you Flee her in the Morning, prepare her accordingly in her preceeding Supper, with weathering in the Morning, that she may come sharp set.

To take Sparrow-Hawks.

IN regard of the use and and pleasure, together with the commonness of the *Sparrow-Hawk*, I hold it not amiss to give these Directions for the taking them. You should choose out some level piece of Ground, with a good *Covert* or *Thicket* near it, where you may be concealed, there fix about half a Dozen Sticks, about the bigness of a Mans *Arm*, and about six Foot long, on each side three, to these Sticks must be fastned certain *Nets*, made of very Fine Green Thread, and to them a *Cord*, which may reach to the *Man* that lieth concealed in some Bush; on the plain must be set several small *Birds*, especially *Chafinches*, which sort of *Bird* the *Sparrow-Hawks* much delight to Feed upon, and she will not fail to Flee with great Eagerness into the *Net*, thinking to Seize the *Bird*; and doth become ensnared. In Winter they are often found *Pearching* on some Tree in *Hedg-rows* near *High-Ways*.

CHAP. XII.

Rules for Reclaiming the Haggard-Faulcon, *with Instructions to enter her to the* Lure; *which Directions will serve for all Long Winged Hawks, Except the* Merlin.

HAving one of these *Falcons*, set her down and let her rest quietly the first Night, in, some convenient place, in her *Rafter-Hood*; then the next Morning Early, take her up easily on your *Fist*, and carry her all day up and down thereon, gently stroaking her with a *Feather* until you find her Gentle and Bold, so as not to start when she is touched, and some times with your *Hand*; and when you find her not Coy, take off her *Hood* being alone, putting it on presently again; and this do till she will Feed; giving her but a little at a time, and do not pull her *Hood* off, or put it on without giving her a bit or two, useing your *Voice*, which will gain her love, for by this means when she is *Reclaimed*, she will know when she shall be Fed, and when she will Feed Boldly. The next thing is to teach her to jump from the *Pearch* to your *Fist*, which is thus done: Let her stand on a *Pearch* about Breast high, so that they take no Offence, or Fright, until they are acquainted therewith (for the first handling or using of a *Hawk*, is the making or marring her; and an ill Habit she is not easily reclaimed of;) then unstrike her *Hood*, and *Lure* her, using your *voice*, but be sure you do not affright or distast her, that thereby she may *Bate* from you; therefore be sure unstrike her *Hood*, and encourage her with some *Food* to come to you. Now for the better bringing her to subjection, it is good to keep her with a sharp Appetite, for unless that be rightly observed, all the rest is to little purpose.

When you find by this means that she will freely come to your *Fist*, and be not apt to take offence, you may let her set *unhooded*, keeping by her to hinder her gazing about by your diverting her, and often *feeding* her with a Bit or two; and when she is brought to this pass, and will boldly receive your *Bits*, hearken to your *voice*, and jump to your *Fist*, then you may set her to the *Lure*.

When you find she will readily come to your *Lure*,

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Lure, which must be garnisht with Meat in the *Creance*, put a young *Pigeon* to the *Lure*, and therewith *Lure* her; and when she hath killed it, and eaten the *Head*, take her up gently with a Bit of Meat, and put on her *Hood*; then unstrike her *Hood* and *Lure* her to the *Pelt*, using this twice or thrice; but if you do it often, she will be very unwilling to part with the *Pelt*, and by consequence provoke her to carry, which fault is more accustomary, and worse in a *Field* than *River Hawks*. You must have a great care that you *Lure* her not too far till her *Stomach* be perfect, else she may find out something by the way more pleasing to her, which will occasion her stay, and prove of ill Consequence in her obeying you.

Also observe that in the time of her Making (whilst she is on the Ground, *Pluming* or *Feeding*) you walk about her, often Feeding her with your *Hand*, and using your *Voice*, which will much win upon her, especially if you give her a live *Pigeon* between the *Falconer* and the *Lure*, in a long *Creance*, that she may kill it near you, and in such manner, that she may trust it over your *Head*; and by this means, when you come to her from some Distance, she will not be afraid, but delight to come to you; and the neglect of this will make her timerous, so that sometimes she will not only leave her *Prey*, but forsake you. And there are some *Hawks*, that will not be taken up without *striking* or *Raping* in the *Creance*, which without such a Device must be the loss of the *Hawk*, so that the *Falconer* ought to be very careful to *Reclaim* her from such *Vices* in her first Making.

To make your *Falcon* (or indeed any other *Long Winged Hawk*) a right and perfect Flyer, these following Directions should be observed.

When you have Fed her on the *Lure*, so that she knoweth it, then begin to *Lure* her in the *Creance*; and when she will come nimbly and readily thereto, then Flee her loose; and when she will come nimbly loose, then give her *Trayns* between the *Man* and *Lure*, which is thus to be done; Let your *Falconer*, or he that holds the *Hawk*, go at some distance one from the other, (but he that *Lures* her, must be up the *Wind*) and when he that carries the *Hawk*, has drawn her *Hood*, then begin *Lureing*, and she (being acquainted with your *Voice*) will make up to you. Then having a *Pigeon* ready sealed, or a *Feather* put through her *Eye-Lids*, to make her look upwards; and by this means in three or four times you may venture to stoop the *Lure* upon her, and let her fly a turn or two over your Head; and then have a *Pigeon* ready sealed to give her, with a short pair of *Creances* to the *Pigeons Leg*, that if in case your *Hawk* should be shy, you may hold it, that she can't carry it away.

If your *Hawk* prove gidy Headed to go at *Check*, and carry her *Game* with an unwillingness, to let you come in to her, then load her with heavy *Bells*, and *Cope* her *Beak* above and below, to the very Quick; and *Sear* the Point of her *Beak*, with a hot *Iron* till the *Blood* comes, and this will hinder her from eating that which she gets her self; So that by Degrees she will be fond of your coming in to help her, to meat which you must always shew her, as you come in unto her in your Hand; and in a little time this will *Reclaim* her of that Roaveing *Kytish-trick*, of carrying away the *Quarry*, and make her as aforesaid very fond of you, if duly observed; For when she finds she can't kill of her self through the weightiness of her *Bells*, nor carry it to eat by reason of her *Coping* and *Searing*, she will be willing to come to you. Then having her Stomach sharp set, after a due *weathering* of about three *hours*, the being sometime without her *Hood*, and Water set in a large *Pan* to see if she will *bathe*; and if so, then she must continue until she hath dried her self; Then ride with her on your *Fist* into the *Field*, and strike her *Hood*, whistling softly to provoke her to fly, and doubtless she will make some motions either to *Bate*, *flap* with her *Flags* and *Sails*, or advance her self on your *Fist*, which Motions suffer her to use until she either *rouse* her self, or *mute*, and when she hath done either of them *unhood* her, and let her flee with her *Head* to the *wind*, that she may the better get up on the *Wing*, and she will then naturally climb upwards, fleeing round; and when she hath made two or three turns, *whoop* to her, and when you find her coming in and near you (but not before) cast out your *Train* into the *wind*, and if she stoop to it, *reward* her well with some Bits of clean and sweet *Meat*.

When your *Hawk* is perfectly *Reclaimed*, and throughly made by gentle and fair usage, you may adventure to flee her every day, provided you feed her accordingly: For if you flee upon Rest you shall never have a good *Hawk*, nor make a good flight; for Rest filleth them with glut, fat and ill humours, which are purged and wrought out by Exercise. Whilst they continue wild they cease not to get their *Prey*, come what Weather will, *fair* or *foul*, *Winter* or *Summer*; and certainly it is most natural for them to be so used by us: Howbeit we must observe a due regard to the state and condition in which they are, and that much of their Natures are altered whilst they remain under subjection.

You must be careful to observe the Nature and Disposition of your *Hawk* at the time of her *Luring* and *Making*, and be sure you give her no great scope to fly high or be wild; but hold her down, and near you, in case you find her high minded. Contrariwise some *Hawks* are so lazy, or fond of their *Keeper*, that they care not much to stir from him were a *Partridge* sprung up near her: such *Hawks* must be quickned by setting a good edge on their *Stomach*, and training them up by little and little; for the dullest of them are capable of Preying for themselves when Wild, and assuredly by Art and Observation they may be brought to do at least as much for us; They want neither Mettle nor Strength, the only thing is how to set them to work. Those that are dull and lazy ought to be deprived of the assistance of other *Hawks*, which will be a good way to enforce them to work for themselves; and if they do not yet give you content, do not abridge them of their *Reward*, but try them further, and by degrees they may be brought to know their own strength.

When your *Falcon* is become so familiar and gentle as to sit bare-faced in an *Evening* amongst *Company*, then and not before may you adventure to give her a *Stone* or two over *hand*, which you may do every other *Night* until you find her *Stomach* good, and then you may proffer her *Castings*, which she will not refuse; but have a great care not to distast her, but let her have it with her own Will and liking, lest she take an aversion to it, as some do through their *Keepers* Indiscretion, and by no means let her *Castings* be too big.

If you should give her *Castings* before her *Stomach* is well prepared by the *Stones*, it would signifie nothing; for they are as it were the Key of the Work, that the *Grease* and *Glut* may be stirred and dissolved, so as to be fitted to pass away in her *Mewts* downwards, or in her *Castings* upwards.

The best time of giving *Stones* is doubtless at Night, until she be throughly clean, and then in the Morning, but not until she hath put away her *Supper* from above; half a dozen at a time are sufficient, and to do well they should be given above the *Hand*; but for that every one hath not a ready skill, you may Cast her, and give them so without danger, if it be carefully done. This course must be continued until you give her *Plumage* in her *Luring* and *Training*; and then must you add the bending of the *Wing*, being the short *Feathers* of the *Pinion*, with as much clean wallit *Flannel* as will make a reasonable *Casting*: and remember in using *Stones* and *Casting* to observe this old Rhime,

Waste Meat and Stones will cause a Hawk to fly;
Long Fasting and great Casting will cause a Hawk to die.

But I shall forbear any more at present concerning *Stones* and *Casting*, it being more proper in the *Chapter* relating to the *Diseases* and *Cures* of *Hawks*.

In *Reclaiming* the *LANNER* and *LANNERET*, be sure to make them well acquainted with the *Lure*, which should be garnisht with hard washt *Meat*, and let her take the greatest part of her *Reward* in Bits from your hand, and be careful to restrain her from dragging or carrying any thing away from you, which ill quality she is much subject unto more than any other *Hawk*: For what else relates to the *Reclaiming* and *Manning* of the *Lanner*, is the same as for the *Falcon*.

When your *Hawk* is perfect at the *Lure*, then spring her up a live *Pigeon* as she comes in unto you betwixt the *Man* and the *Lure*, remembring to tye a long *Creance* at the *Pigeons Feet* that she may not flee from you, but that the *Hawk* may Truss her if possible over your Head, or very near you, lest if she kill it at a distance, and take some offence when you come towards her, she forsake both the Prey and you; therefore be very careful to prevent her getting any such ill quality at first; for preventing of which be sure to gain her love by making her bold and acquainted with you, as already treated of, and do not deceive her in her *Rewards*. But if you should have such a *Hawk*, that notwithstanding all care (as some such there are) will be apt upon the least scope of liberty to turn Tail and leave you: In such case you must somewhat abate her *Pride*, with respect to the Season of the *Year* and the *Weather*; which done, get a *Quarry Hawk* (that is, an old Well-entred and *Reclaimed Hawk*) and a couple of live *Fowl*, and let her see them flown once or twice, and at length when your *Quarry Hawk* is coming to kill it, be sure to stand under the *Wind* with her, and let her see the *Fowl* overthrown, and go into the *Quarry*; and if she go in with courage, and seize it greedily, make in apace crossing the *Fowls Wings*, and suffer both the *Hawks* to take their pleasure a little while together; then take up the *Quarry-Hawk* gently with clean Meat, and let the young *Hawk* enjoy the *Quarry* to her self, keeping on your Knees to assist and please her. You must be very careful that she swallow no *Pelf* to glut her, but give her clean Meat for her *Reward*, and let her have her Supper, as she sits on the *Fowl*, clean washt and well dresst.

If you can't have the conveniency of a *Quarry-Hawk* at first making your Young one, then be sure to cast her off with the most advantage you can of *Wind* and *Stomach*, and let her take not too much pains before you shew her the *Fowl*; and if she doth not make her first not second *stooping* right so as to kill, then have in readiness a *Tame Fowl* as near the colour of the Wild as you can, and therewith take her down before she has too much toiled her self; for many *Hawks* will take discontent when they find they miss killing their *Prey*, and so leave their Master.

Further Rules for Reclaiming and Manning Hawks, *and entring them to be acquainted with the* Spaniels.

IN *Reclaiming* and *Manning* your *Hawk* remember, that Haste makes Waste, and he that boasteth of his Art in making her ready to flee in a *Month* or sooner (as some such there are) I hold him very indiscreet, and little understands the nature and conditions of her; for it is impossible to bring her to perfection but by degrees, as first he must abate her Flesh, and if then you offer to Flee her before she is in her Pride and lusty again, she is for ever spoiled; besides she must have some teaching to come as well go, and she must be acquainted not only with the *Dogs* in general, but with those in particular that are to be used about her.

He that offereth to Flee her whilst she is poor and low, shall never have her free from *Diseases*, nor can he receive any content in her, as being not able to make a good flight; and to Flee her before she is acquainted with the *Dogs*, as well as her *Keeper*, may go whistle after her, and not be Master of her in haste.

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It hath been already said, That whilst you endeavour to *Reclaim* your *Hawk*, you should divide one *Meals Meat* into three parts, and to feed her the ofner; and now when she is *Reclaimed*, you must increase her *Meals* somewhat every day. You are to have a great care that during the time of *Reclaiming* she doth not soar up too high, and that she be throughly *Enseamed* before you Flee any *Fowl* with her, be she *Eyish*, *Brancher*, *Ramage*, or *Mewed-Hawk*, lest peradventure she *soar* out of sight and be lost. Also observe, that during the time your *Hawks Feet* continue blackish and rough, she is full of *Grease* and *Glut*; for as she *Enseameth* her *Feet* will become *yellow* and *smooth*, and when they are very *yellow* and *smooth* she is perfectly *Enseamed*: But this is better known by her *Castings* and *Stones*, especially after any laborious flight, when her *Castings* and *Stones* will be greasy and slimy, and her *Mewts* will be foul and discoloured.

In teaching your *Hawk* to Flee to the Field, it is good to have other *Falconers* to assist you with their *Hawks*, and to do well the *Hawks* should be tyed to the ground to prevent their taking Wing before their time. Nor do not bring her into the Field to Flee until she is well acquainted with the *Spaniels*, and the better to effect the same observe these Directions. Feed her always in the midst of the *Dogs*, and when she is bold ever and anon throw a *Pigeon* in a short *Creance* amongst the thickest of the *Dogs*, suffering her to *Quarry* amongst them and to *plume* for a while; then take her up to your Fist with some Stump, and soon after cast out the *Pigeon* again and again, until you find she is bold and ventures amongst them, and with your Whip lash the *Dogs*, now and then crying, *Ware Hawk, ware*, which will much encourage her; and when she is come to this pass you may venture to Flee her. And for the preventing these ill qualities that *Hawks* are subject unto, at first train her up well, and for the effecting of which observe these Directions: Provide three or four hand *Partridges*, if possible, or for want thereof live *Pigeons*, and have the assistance of a Man or two, with one or two Couple of *Staunch Spaniels*, choose a plain large *Field* in which there is not above two or three *Bushes*; let one of the Men take the *Dogs* with him, and beat the *Bush* or *Brake*, making a noise to the *Dogs* that the *Hawk* may see, hear and observe it well; then let him dexterously throw off the *Partridge* or *Pigeon*, so as she may suppose it to have sprung out of the *Bush*, your self holding the *Hawk* to the most advantage; and at the time of throwing off the *Partridge* or *Pigeon*, cry *Gaze ho*, which using frequently will make her observe her *Game* and opportunity. By this Artifice there is no doubt but that she will go off with Mettle, especially if you bring her to a right sharp *Stomach*. You must be vigilant and quick to make in after her, that she may receive no fright by the coming in of the *Dogs*, or the like; and your *Spaniels* being got near about her, teach her to break the *Head* in her *Foot*, and to eat it on the ground; and when she hath made an end thereof, and begins to look about her, be provided with the *Wing* of a *Pigeon*, and let her jump to your *Fist*, and feed thereon.

For her *Supper*, you should prepare good fresh Meat of *Pigeons* or other *Feathered Fowl*, which must be well and clean dresst. This course should be observed with four or five *Partridges* in several Afternoons, with some advantage to your *Hawk* in her going off; but every day less and less, that she groweth not lazy; for should you at the first hand use her to kill whatever she flies at with ease, and at the *Sowce*, she will expect to be so treated, and perhaps refuse to fly after any that are *sprung* at a distance from her, but cast her *Regards* another way, as being lazy.

Some *Hawks* at first entrance, if they fly a *Partridge* hard to the *Covert*, and take it not at the first flight, will set on the Ground losing the advantage of getting upon some Stand, whereby she will never see the *Partridge* again at the *Retrieve*. This for a short Winged *Hawk*; but if for a long Winged one, and that she fall to the Ground, then let the *Falconer* shew her the *Pigeon* and *Lure* to make her take to her *Wings*, and then call the *Spaniels* to a *Retrieve*. Now to prevent this Jadish trick, make into her with the *Dogs*, having first called them off: And for a short winged *Hawk* shew her some Meat, and take her to your *Fist*, or make her take her stand in a *Tree*.

Rules to Reclaim Hawks brought from the Cage, and how to Hood them.

WHen you get any *Hawk* that is brought from the *Cage*, you must proceed with her in a different way from the former; for she must be *Reclaimed* in this sort. Give her at least three *weeks* carriage in her *Rufter-hood*, always stroaking and playing with her, at first with a *Feather*, and then with your *hand* very gently. You must feed her with clean wash't *Meat* (which must be warm, and for the most part *feathered Meat*) all the time, which will bring her the sooner to a good *Stomach*, and to be well pleased and gentle, which you may discern by her listning to your *voice*, by her *chirping*, her eager *feeding*, or the like, (this to be done within three or four days after your first taking her to the *Fist*, by which means she will thrive much the better, and come sooner to a *Stomach*;) then *wash* her all over with *water* and *pepper* prepared for that purpose some Evening, or which is better, smoak her with *Tobacco* when she is empty.

Having thus prepared her, and being provided with another *Hood*, take off her *Rufter-hood*, and as she groweth dry put on the *Hood*, and give her a Bit or two of Meat to please and refresh her. And thus you may continue for some hours *hooding* and *unhooding* her, *Rewarding* her with the best Meat you can get, until she is throughly dry, and then set her down bare-faced, permitting her to take two or three hours rest in some warm place, and on a dry *Perch*, to prevent *colds* and the *cramp*, which at such times they are subject unto: Then when you come next unto her, let your *voice* give her notice of your approach, that she be not surprized with fear or distast, and let her see you come with *Meat*, but give her none until she is *hooded*; and use her so for some time, that you may bring her to a liking of her *Hood*, which she will soon do when she finds that the putting it on ushers in Meat. All this while divide one *meals Meat* into three, feeding her ofner; and be sure in this interval to observe her Nature and Temper, and accordingly guide your self: For it is not a Work of less than a large Volume to give particular Directions for the temperatures, &c. of every sort of *Hawk*. These which are here laid down, with your own Reason and particular Experience, may suffice.

Now for as much as I am fallen on this Discourse of *Hooding*, I hold it not amiss once for all to give you this Direction and Caveat; you ought to be exceeding careful in *Reclaiming* her to take her *Hood*. You have already laid down some Directions how to preserve her from this ill vice, it will not be amiss to give you one how to remedy it, although she were almost quite spoiled through ill usuage and bobbing. You must be provided with a *Hood* of some light colour, as *Green*, *Red*, or *Yellow*, which hang on your little *Finger* of the same *Hand* whereon you carry your *Hawk*, and let it hang so that it may be always in her sight, especially at such times as you feed her. This do for about a *Week*, or until you find her acquainted with it so well as to search through the *Hood* for the *Meat*. If you interpose it when she doth this boldly, you may then sometimes essay to beat a little hard with the *Hood* against her *Head*, by which means she will in about a *Month* come to *Hood* and *Unhood* her self, as often as you please. And whereas before you used to restrain her from *eating*, let her now *eat* moderately when she is *Hooded*, and never but then; nor should you take off her *Hood* until feeding time: And remember you use not this course with any *Hawk* until her *Stomach* be perfectly come to her, if it be a *Hawk* taken out of the *Mew*. And of all others, you ought to be most careful, as to this point, in handling your *Gosshawk*, for she is (as already said) very nice and coy, and apt to take offence, and withal hard to be reconciled and *reclaimed*, but by degrees and by gentle and soft usage you may overcome the worst natured *Hawk* that is.

To help a Hawk that is coy and fearful.

IN case your *Hawk* is coy and fearful, so as not to indure the sight or noise of *Strangers*, *Passengers*, *Horses*, or the like, you ought to consider from whence this happens, which doubtless is from her *Keepers* not rightly *Reclaiming* her: For although all *Hawks* do this by Nature, yet by *Art* they are brought to leave it; and it is easier to *Reclaim* two Casts of young wild *Hawks* than one *manned Hawk* that hath been ill handled in her first making.

Before you begin to practise on such a *Hawk*, carry her a day or two upon your *Fist*, and when through *watching* and *manning*, she hath a sharp *Stomach*, and withal is somewhat gentle, repair to some place where there is a great resort of *People*, as at a *Bowling-Green*, or the like; then put her into a pair of *Creances*, set her on a Man's *Fist*, and let her jump to a *Catch*, and there pass away the time in this manner with her every *day* as oft as you can for some *Weeks*, now and then practising it at the end of some great *Town* on a *Market-day* where *People* pass, permitting her to sport and play on the *Catch*: And by often practising this way, you may bring her off from that ill quality whereunto she was addicted through the fault of her former *Keeper*.

There are some *Hawks* that will not flee with others, but draw backwards: There are also others that *Bind* with every *Hawk*, and so flee for the purpose: And others again do hate either to flee or set with any others, which is occasioned either through fear, or for want of love to them. For the helping this ill quality, get a gentle *Lanner*, being an old and true made *Hawk*, which set on the same *Perch* with the other *Hawk* by day, but at a good distance, then give each a bit of *Meat* as you pass by them, and so by degrees set them a little nearer together, and when you find it convenient, put some *Meat* between them that both may feed together. If your *Hawk* makes any motion to *Crab* with the *Lanner*, *gorge* her up at Night with good *Meat*, and set her on a *Perch* abroad in the cold, (provided she be in good plight, and able to indure it) and let her set their three or four *hours*, and hold the *Lanner* near the Fire; then bring in the other *Hawk hooded*, and hold her close to the *Lanner*, and when she finds the comfortable heat received from her she will draw nearer and nearer unto her. Let them thus stand together until she seem very desirous to *Jouk*, then *unhood* her gently, and let them both stand close together all Night, and in the Morning set them on the *Perch* near together, but not to reach; and continue to do in the Evening as aforesaid: And about the fourth or fifth Night you may adventure to set them both out in the *cold* on the same *Perch*, so as they may come to each other for vvarmineſs. And vvhen she is thus brought to love Company, you may *unhood* them, *Feed*, *Perch*, and *Lure* them together.

CHAP. XIII.

How to Enseame a Faulcon with her Castlings and Scowrings.

WHen your *Hawk* is vvell in *Blood*, and vvell *Quarred*, let her flee vvith other *Hawks*, but *Reward* her vvell at the beginning, suffering her to feed vvell on the *Quarry*, vvhich vvill so encourage her that she vvill have no mind to go to the *Check*.

When you feed her, *Call* and *Lure* her (as if to the *Lure*) and proffer her *Water* every *Day* and every *Night*; give her *Castings* according as she *endeweth*.

In

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In the Evening by *Candle-light*, amongst *Company* take off her *Hood*; and set her on the *Perch* with a Light by her.

You should make your *Lure* to imitate, or counterfeit the *Game* you design your *Hawk* for; If for a *Gerfalcon* (whose *Game* is the *Hern*) then your *Lure* should be Garnish't with a *Herns Wings*; if for a *Falcon*, a *Lanner*, or other long *Winged Hawks*, then tye a *Partridges Wings* to the *Lure*; and if for a *Goshawk*, then those of a *Partridge*, or *Pheasant*.

If you would make your *Goshawk* for the *Pheasant*, Feed her always on the Ground, or in some thick place where she must encounter the *Pheasant* at *Perch*; and first enter her at a young *Pheasant*, and every time call her from *Tree* to *Tree*, that she may learn to take her Stands.

You should *Reward* her upon the *Lure*, with what *Fowl* she Kills, to make her the more in love with it.

If you would have your *Hawk* clean and sound, she should have *Castings* every *Night*, until she is made clean; also *Tireing* or *Plumage* at Night is very good, provided she hath not been hard Flown.

You may Flee your *Falcon* twice a day at the *River* (if the Season be good) and three or four Flights at the Field.

You should Feed your *Hawk* until it is fitting to give her *Plumage*; and for your doing the same, observe these Directions. If her *Mewts* are white, and the black thereof very black, and not mixt with another Colour; and if she be sharp set, and *Plumes* eagerly, you may give her *Castings*, either of the small *Feathers* of a *Hens Pinion*, or for want of any other of a *Coneys* or *Hares Foot*.

You should make the place under the Perch clean, to see if the *Mewts* be full of *Streaks*, or *Fellenders*, or *Slimy*; for if so, the aboveSaid *Casting* must be used three or four *Nights* together; but if you find the *Feathers*, or *Casting* sweet, or lapt round, and the *Water* within it clean, like Spring-Water; then give her *Pigeons* or such like good wash't *Meat*.

CHAP. XIV.

Rules for Bathing a Hawk.

FOr *Bathing* your *Hawk* 'tis good to offer her Water once a *Week* in the *Winter*, and twice, or thrice a Week in the *Summer*; but use no force to provoke her to *Bath*, for a young *Hawk* that is Sound and Strong, doth not care for it, but those that are Old and subject to infirmities delight therein, as being a great refreshment to them, creating a sharp Appetite; but be sure give no *wash't Meat* in the Days of *Bathing*, neither go abroad with her; and after *Bathing* give her a Bit or two of hot *Meat* unwash't.

If the *Weather* be Fair and Temperate, let her dry her self abroad, otherwise help Nature with Art, and never let her *Bath* in Frosty Weather. If she refuseth to *Bath* in a *Bason* (as some will) then carry her to some small *Brook*, and suffer her to stand up to her Thighs; and in the time of her *Bathing* she must be *Unhooded*, to prune and pick her self.

CHAP. XV.

To make a Hawk Bold and Hardy, &c.

IF you would have your *Hawk* Bold and Hardy, keep her oft times all Day on your *Fist*, and feed her early in the Morning, with the Flesh of some *Fowl*; then set her abroad in the *Sun*, with *Water* before her, to *Bath* and *Bowz* her self as oft as she pleaseth, (for if a *Hawk* hath any Infirmity, *Bowzing* will soon Cure, or Kill her); and when you have so done, take her up and carry her on your *Fist* all Day; and at *Night* set a lighted *Candle* before her, to burn till Day break, and if you perceive she hath been well *Manned*, and is fully *Enseamed*, you may adventure to Flee her, observing the aforesaid Directions.

If she Kill, give her a good *Gorge*, and in case she miss, you must have some sweet *Pelt* to encourage her; and thus must you Flee her daily, remembring to observe not to bring her too low through overmuch Flying.

If you would have your *Hawk* love her *Prey*, and be very eager upon it, you need only bring her with a good Sharp Stomack.

To make your Hawk Disgorge her self.

IN Case your *Hawk* be full *Gorged*, and yet on some occasion you have a desire to Flee her, take three or four *Corns* of *Wheat*, which put into a small piece of Flesh, and give her; and it will forthwith cause her to *Disgorge*, and be ready provided with a little good Hot *Meat* to give her; and then you may Flee her without Danger.

Or if you desire to Flee her in the *Morning*, Feed her the *Night* before with good warm Meat, well wash't in *Urine*, the Water being well wrung out, which will set a sharp Edge on her *Stomach*, and raise her Courage.

To Remedy a Hawks ill Quality, of Fleeing to a Tree, and stand and Gorge.

IF your *Hawk* hath got an ill Quality of Fleeing to a *Tree*, as soon as she hath Killed her *Prey*, and there *Gorge* and eat it (as some will do.) To Remedy this, let her be short Couped as before directed; then take a Leather of the Fashion of a *Bewet*, which put on either of her *Legs*, upon one of her hinder *Tallons*, and then button it on to her *Bewet*, whereon her *Bell* hangs,

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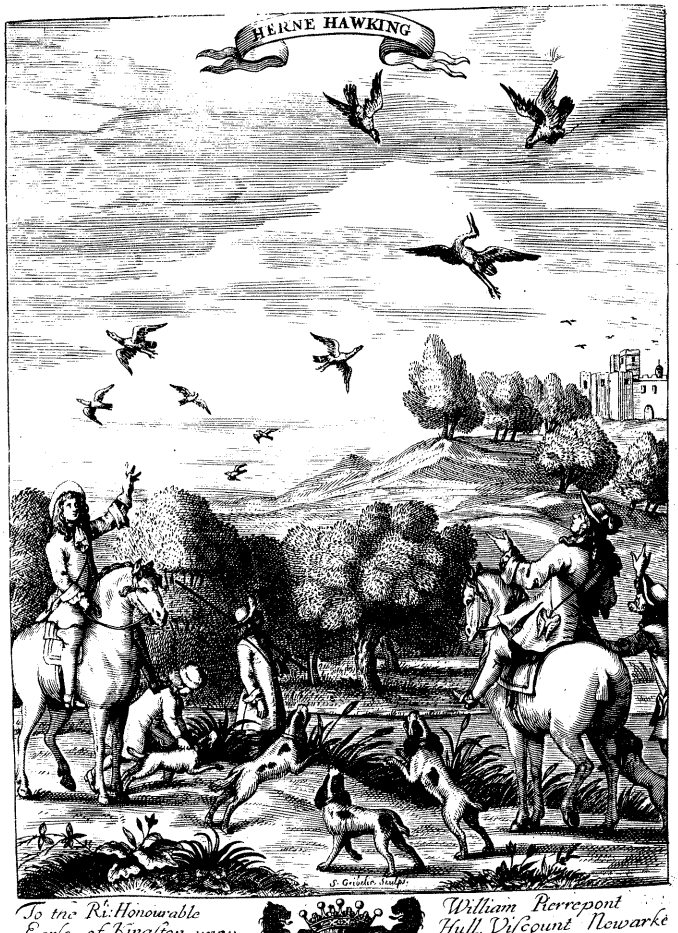

To the Rt: Honourable Earle of Kingston upon Upon Trent, Baron of Manvers and William Pierrepont Hull, Viscount Newarke Holme-Pierrepont Herris &c.

This plate is humbly Didicated by Ric: Blome

hangs, which will so hold up her *Tallon*, as to hinder her gripeing; and consequently she can't sit on a *Bough* to hold a *Bird*, and to feed thereon, which will force her to forsake the *Tree*; and thus doing five or six times, she will leave this ill Quality.

CHAP. XVI.

Directions for Feeding your Hawks.

FEed not with two Sorts of *Meat* at one time, for that Breeds ill Humours, as also *Worms*; it will also fill her with *Wind*, and make her very unhealthful. Also forbear to Feed her with Old Stale *Meat*, being hard to *Endew*, breeding Infirmities: The *Flesh* of a *Brood Hen* is very naught, as also of all Fowl that live on *Frogs*, *Fish*, or the like: so is the Flesh of Ravenous *Birds*, as the *Kyte*, *Pattock*, *Crow*, *Raven*, &c. It is good to change her *Meat*, and sometimes to give her the Flesh of *Coneys* or *Hares* (but not the *Brains*, nor any of the *Hair*, for that breeds *Worms*.) *Mutton* is good Food for *Gerfaulcons*; but the Flesh of a *Lamb* and *Kid* is good when your *Hawk* is low and poor. *Dogs* Flesh is very good and sound *Food*, for all *Hawks* of a hot Nature; but not whilst they are Fleeing. *Cats* Flesh is good in the *Mew*. The Flesh of small *Birds*, or indeed any that feed on *Seeds* is very good; but do not give them much, nor often, unless at such times as your *Hawk* hath been abroad in the Cold all Night; for such *Birds* are by Nature very hot, and will make your *Hawk* very stately, and hard to be *Reclaimed* from her Pride and coyness. The Flesh of *Pheasants*, *Partridges*, *Pigeons*, and the like, is good, especially if she be sick; but the Flesh of *Chickens* and *Pullets* is very good at all times, and never out of season.

CHAP. XVII.

HERN HAWKING.

ABout the beginning of *March Herns* make their passage; and if you would have your *Hawk* for this *Game* (which is a most noble Flight) let them not fly longer at the *River*. For this Flight you ought to have a *Cast* of *Hawks*, and that they may be the better acquainted together, and be assistant to one another, call a *Cast* of them to the *Lure* at once; but be careful that they *Crab* not together, which will endanger one another in their Flight.

Your *Hawk* being clean scoured, and sharp set, you may enter her for the *Game*, by getting a live *Hern*, which tye in a *Creance*, or else disable its *Wings* that it can't fly, and setting her on the ground *Unhood* her, and let her fly at the *Hern*; and if she seize it, make in apace to her succour, and let her *plume* and take *blood* thereon; then take the *Heart* and give it her on your *Hawking-Glove*; then rip up her *Breast*, suffering her to *plume* thereon until she is well *gorged*; then *Hood* her upon the *Hern*, suffering her to *plume* at pleasure; Then take her on your *Fist*, and let her tyre on the *Foot* or on the *Pinion* of the *Hern*: Then let the *Faulconer* take the *Hern*, cast it about his *Head*, and *Lure* her to come, not casting it out, but stay till she come to seise it in his *Hand* as he *Lureth* with it, and let her feed thereon. Thus in three or four times so doing, you will bring her to good perfection at this Flight.

For preserving your *Hawk* from the danger of the *Herns* Bill, place a Joynt of a *hollow Cane* on the upper part of their Bill.

Having well entred your *Hawk*, let loose a *Hern* in some fair Field without a *Creance*, or without Arming her; when she is up at a reasonable height, cast off your *Hawk*, and if she bind with the *Hern* and bring her down, then make in a pace to her help, thrusting the *Herns* Bill into the ground, and breaking her *Wings* and *Legs*, to the end the *Hawk* may with more pleasure plume and foot it; then *Reward* her with the *Brains*, *Heart*; &c. as before directed.

Having shewed you how to enter your *Hawk* at a *Train-Hern*, I shall now give some Instructions how to Flee her at the *Wild-Hern*. When you have found one, get in as nigh as you can unto her, going under the *Wind* with your *Hawks*, which must be a *Gerfaulcon* or a *Jerkin*, with a *Haggard slight Faulcon* for your *Driver*; and having their *Hoods* loose in a readiness, so soon as the *Hern* is put up and got up upon her *Wings*, throw off your *Driver*, which doth make in unto the *Hern*, and causeth her to work into the *Wind*; the let go your *Hawks* that are to fly her, and when they have worked above the *Hern*, that they come through her, and by often doing it doth occasion her coming to *Siege*, then make all the haste you can to assist her by breaking her *Legs* and *Wings*, and thrusting her *Bill* into the ground: And for this flight you must always have a *Dog* that should be trained up to the Sport, whose business is to come in and kill the *Hern*.

But in case your *Hawk* doth fail to beat down the *Hern*, or doth give over the *flight*, then give her a *Train-Hern* or two more before you shew her another Wild one; then fly her with the *Quarry* that is well entred, and in good flying; for thereby she seeing the *Quarry-Hawk* flee at her, and bind with her, she will take fresh courage and become bold; and when they have killed the *Hern*, *Reward* them both together whilst the *Quarry* is hot.

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CHAP. XVIII.

BROOK HAWKING.

HAWKS for this Sport are the *Gerfalcon* and *Jerkin*, the *Haggard Falcon* and the *Tassel Gentle*.

In many places there are *Ponds* enclosed with *Woods*, *Bushes*, and the like obscurities, so that they are concealed from *Passengers*; and such places *Ducks* do much resort unto. Now for the Training up your *Hawk* to take them, observe these Directions.

Your *Hawk* being in all points ready to fly, be provided with two or three live *Train-Ducks*, and let there be a Man that must lie concealed in some *Bush* by the *Pond* with them; so that coming to the place, having your *Hawk* prepared for the sudden Flight, beat the *Bush* with your *Pole* where the Man lieth concealed with the *Ducks*, who must cast forth one of them, to the end the *Hawk* may think it was put up by you, and if with a Courage she takes it, *Reward* her well. And this is the way to train up up a *Goshawk* to catch a *Fowl* at *Sowce*.

Having trained your *Hawk* to this, you may boldly go with her to the *Ponds* where the *Fowl* lies, and creeping close to the place raise them up by beating about with your *Pole*, and when any rise let go your *Hawk* from your *Fist*, and if she seize it let her take pleasure thereon, and *Reward* her well.

It is very necessary to have a *Spaniel* with you; for if the *Hawk* is well acquainted with the Sport, she will be so nimble at the Catch, that they will fall into the *Water* together, and by that means the *Fowl* may go to Plung, so that then the *Spaniel* will be ready to do good Service, and not displease the *Hawk*.

A Flight for a Falcon *to the River.*

WHen your *Hawk* will *fly*, *jump*, and come in at your *Lure*, then she is fit to go to the *River*; and to manage your Flight observe these Directions: When you have found where the *Fowl* lies, then go about a quarter of a Mile up in the *Wind* to the *River* side, and whistle off your *Hawks*, loosing their *Hoods*, and let them fly with their Heads in the *Wind*, for there must be a Cast of *Hawks* for this Flight. Then let the *Falconers*, or others that are at the sport, strike their *Poles* in the Water to cause the *Hawks* to come in unto you and own the *River*; and when they are got up into their places, then let one of the *Falconers* ride down to shew the *Fowl*, and when the *Hawks* have made their *stooping*, and have *ennued* the *Fowl*, then go off from the *River* again; and when the *Hawks* have made good their places, then let one of the *Falconers* go below the *Fowl*, that is, down the *River*; and the other that is above, let him come down and shew the *Fowl* again, and by that means the *Fowl* will be crost over *Land*, that the *Hawks* may make a fair *stooping*, and knocking the *Fowl* on the *Land* will occasion the killing it, which will *Quarry* your *Hawks*.

But if they should miss their *Stooping*, so as the *Fowl* may get to the *River* again, then your *Hawks* must go to their *Wings* to make good their flight; but if the *Fowl* should go to *plung*, then take down your *Hawks*, lest you should fly them too long, and the *Faulconers* with their *Spears* or *Poles* may endeavour to *Spear* or kill the *Fowl*, which take to *Quarry* the *Hawks* with.

If they kill not the *Fowl* at first *stooping*, give them respit to recover their *place*; and when they are at their place again and their Heads in, lay out the *Fowl* as before directed, and *Reward* them well if they kill.

You should do well to have a live *Duck* in your *Hawking-Bag*, that if they kill not the *Fowl* which is stooped (as oft-times it happens) than your *Hawks* being at their pitch and their *Heads* in, you may throw to your *Hawks* and *Reward* them; and by this means you shall always keep your *Hawks* in good *life* and *blood*, and to be *Inwards*.

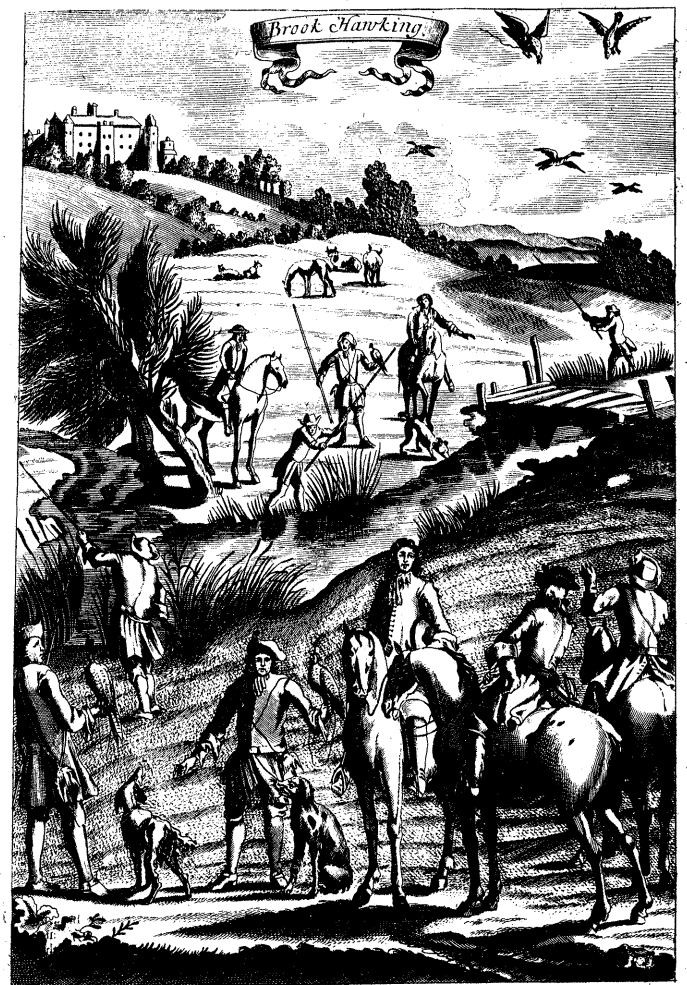
To make a Hawk *Inward of the River, when she Raketh out.*

IF your *Hawk* can't recover the *Fowl* by reason of its breaking away at *stretch*, and gives it over and comes in again, then cast her out a *Seeled Duck*; and if she *stoop* it, or *truss* it, cross the *Wings* and let her *plume* and take her pleasure thereon, and *Reward* her therewith, and by this means she will learn to give over the *Fowl* that *rakes* out, and take back to the *River* again.

To keep a Hawk *high flying.*

YOur *Hawk* being well made to the *River*, you should not fly her above two *flights* in the *Evening*, but feed her up although she kills not; and if she be a stately high flying *Hawk*, one *flight* in an *Evening* is sufficient; for often flying will bring her down, and make her fall of her stately pitch, and will become greedy of the *Quarry*.

When a good flying *Hawk* doth get up to a good place, you must continue her therein, Fleeing with her upon narrow *Waters* and *Rivulets*, shuning broad *Waters* and such places that lie near *Coverts*, where a *Fowl* can hardly be landed without the assistance of *Dogs*, and where she can't see the *Water* under her, which are great Impediments, and will cause her to play the *Kyte*, and much abate her *Gate*, and quite spoil her high flying; therefore always keep her as high *flying* as possible; but be sure make her *Inwards*, that is, fond of the *Lure*, and to be in such love with it, as upon tossing it up she will presently come *sowcing* down upon it, which is no small honour to the *Faulconer*, to have her at such command. And if she chance to play the *Kyte* and



To the Worshipfull Gilbert Gerard Cossine of Brafferton hall in the North Rideing of York shire Esq.r Son and heyre of S.r Gilbert Gerard Knight and Baronet by Mary Daughter to the Right Reverend Father in God Iohn Cossine late Lord Bishop of Durham

This Plate is humbly Dedicated by Ric. Blome.

il Tempo vien chi puo aspettare

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and be lazy, then throw her out either some *Train-Duck*, or dead *Quarry*, and *Hood* her up for about half an hour, then call her to the *Lure* and feed her.

Some are of Opinion that in such cases you should not *Reward* her at all, to the end she should not be encouraged to use such ill Tricks; but the former way is adjudged the best.

If your *Hawk* so soon as she hath *stooped* and *endewed* a *Fowl*, will take stand on a *Tree* or *Stump* by the *Rivers side*, *Reclaim* her from this ill quality, by having in readiness two or three *Men* with live *Trains*, and that way which she sits or most bends, let them cast forth the *Train-Duck*, and if she kill it *Reward* her. And thus doing for three or four days, she will be broke of that ill quality.

To make a Hawk *fond of the Lure.*

When your *Hawk* is well *Quarred*, and fleeth well to the *River* with a good *pitch* and a great *Gate*, it is requisite to make her fond of the *Lure*, and to take her down therewith, permitting her to kill a *Duck* or *Pigeon* tied thereto, after she hath made two or three *stoopings*.

The higher she fleeth, the more need there is to take her down.

If it happen that a *Fowl* (being often *stooped*) will not rise again, but fall to *diving* (that is, *plunging*) contrive all the ways you can to kill it by *Poles* or *Spears*, and take down your *Hawk* with the *Lure*, and let her feed on the *Train-Duck* to please her self thereon, and this will make her become fond of the *Lure*. But if you take her down to a sweet Pelt, and *Reward* her well with a warm *Pigeon*, she will be as well pleased as if she had killed the *Fowl*.

In case she useth to rake out after *Check*, and lean out so far as not to come in again to the flight, neither the *Luring*, *Whooping*, nor *Casting* the *Glove* about your *Head* will do the business; for there is no remedy but following her, and if perchance at length she comes in unto the *Lure*, take her gently up, feed her with good *Meat*, and use her kindly as before directed, to the end she may be encouraged, and become in love with your *Voice* and *Visage* against the like occasion.

If you practice this diligently towards *Soar-Hawks*, or *Hawks* of the first *Coat*, they will learn to hold in at *Voice*, or *sight* of the *Lure*, when ever you perceive they are inclined to gad.

All *Hawks* should be set out in the *Evening* before *Fleeing*, to be well aired and sharp set against their coming into the *Field*, and to stand *Hooded* as before directed.

CHAP. XIX.

Rules for Ordering Hawks in the Mew.

As to the *Mewing* your *Hawks*, In the first place it is necessary to know when she ought to leave fleeing, and accordingly prepare her for it, which by most is agreed to be about our *Lady-day*; so that about *October* she will be fair *Mewed*, hard and home set.

Your *Soar* and *Ramage-Falcon* may be kept out longer, and flee her to *May-day*; but your *Haggard*, of all sorts, ought to be put into the *Mew* by the first of *April*: And the older the *Haggard* is, the sooner she ought to be put therein; for Nature will incline her sooner than younger *Hawks*.

It is necessary that immediately after you leave fleeing, and before you put her into the *Mew*, you feed her up to be full of flesh and lusty, which is not acquired by letting her have of the best, and her fill; for then out of a greediness and the heat of her Stomach, she will take too much into her *Gorge*, over-pressing her self, and consequently rather retard through indigestion, than promote by due Concoction the end of your desire. My advice therefore is, that you continue as to quantity and times of feeding, the same Rules as in the time of her fleeing for two or three days, only let her have then *unwasht Meat* to scour and *Enseame* her; then afterwards increase your hand a little by degrees, and let her not glut her self too full, lest she thereby fill her *Stomach* with tough raw Humours, and so fall into Distempers. About a Fortnights observance of this course (if she be found) will raise her Flesh to your desire, and then you may be bold to feed her once a day, but with young *Pigeons*, for three or four days; for they are moist and hot, of easier digestion, and more nourishing than old ones: But for want of young, you may use such as you can get, always remembring that her first *Gorges* are reasonable as to quantity, because at that time of the year most old Feed is drier and harder of digestion than at other times.

With these Observations you shall find your *Hawk* raised in her *flesh*, and setled in her *health*, otherwise she must be put into the *Mew*: And without this preparation she will soon be at a stand, which will give you cause to fear it proceeds from some bruise or inward grief, whereas it is meerly for want of care in the preparing and feeding her in the *Mew*.

When you put her into the *Mew*, be sure let her be free from *Mites* and *Lice*, for such like *Vermin* (which generally attend lean *Hawks*) will obstruct her thriving. You should also put on her *Legs*, instead of her old *Jesses*, a pair of strong new ones, that you may not be necessitated to put her on others at your drawing her out, which can't be done without heating and disturbing her, which at that time should be prevented,

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vented, as being in the prime of her *Grace*. And she should also have *Bells* on, that if in case she break out of the *Mew* she may be heard.

Keep the *Mew* clean swept, and let there be a large broad Pan of Water set therein for her *bathing*, which must have fresh Water every other day. She must have *Stones* also lying by her in *Gravel*; for by her taking and casting of these *Stones* you may know the condition of her Body; and they may be carefully gathered up, clean washt, and laid for her in convenient places to take them again.

If whilst she continues in the *Mew* you give her any *Fowl* killed by a *Gun*, be sure to take away all the *Shot* and bruised *Flesh*, both being very hurtful and offensive to the Natures of all *Hawks*.

As to the situation of the *Mew* (which should be a pretty large ground *Room*) it should be so disposed that no *Vermin*, as *Weesels*, *Polecats*, *Rats*, or the like, annoy it; nor should it be nigh any *Highway*, or where there is great resort of *People*: And the *Perches* should be lined to keep their *Feet* from hurting. Whilst she is in the *Mew* none should come near her but her *Feeder* or *Keeper*: And it were not amiss if you had a *Feeding-stock* in the *Room*, with a *String* fixed thereto to make fast her *Meat* in it, to prevent her dragging it up and down in the dust or filth, which renders it unfit for her feeding: But if you give her no more than she can *eat*, this *Rule* is not to be observed.

Stale Meat is very hurtful, nor should you come into the *Mew* but when you bring something to *feed* her.

It is convenient that the *Air* have a free passage into the *Mew*, and that it have the benefit of the *Sun*, therefore I hold that *broad Lettice Windows* are very good: And you must not let any *Rain* drop upon your *Hawk* whilst she is in the *Mew*.

As for her *Meats* whilst she is in the *Mew*, all small *Birds* are very good; also *Chickens* and *Kid*, and *Eels* cut in pieces, and dipt in warm *Sheeps blood*; and indeed most sorts of *Flesh*, provided it is fresh and sweet. And as to the quantity, let it be rather too much than too little.

Let her *bathe* once in two or three days if she will.

A *Hawk* is not full and firm drawn out of the *Mew* until her *Sarsels* be full grown and hard penned; and when you intend to draw her out, do it with all expedition you can, putting on her *Rutter-hood* very gently, and immediately set her on the *Perch*, that she may rest quietly for that *Night*, until her first heat and fury is allayed, which will be by the next *Morning*; for should you at that time use much striving with her, it would indanger the over-heating her, which will occasion many *Diseases*.

When she is on the *Perch* let some *Company* be discoursing or walking near at hand, that she may observe them, yet not so as to disturb her: And when you perceive her pretty quiet, take her gently to your *Fist*, stroaking her with a *Feather*. If she be troublesome and very coy, set her down again, and take her up a second time about an *hour* after, and so continue until you have gained her love, then proffer her a bit of *Meat*, afterwards accustom her to more carriage; but indeavour with all your Art to prevent her from *Bating*.

After she is taken out of the *Mew*, *hood* her until she hath a good *Stomach*; feed her barefaced, and suffer her *Hood* to be put on gently; and then in an *Evening* by *Candle light* you may *unhood* her, and the next *Day* shew her the *Glove*, and your *Fist*, suffering her to *tyre* and *plume Morning* and *Evening*. And sometimes in the *Morning* when her *Gorge* is empty, if you give her *Sugar Candy* it will help her to *endew*.

When by her eager *feeding* you think she is *Enseamed*, and that you may flee her, carry her into the *Field*, and if empty, she will *Bate* and fly of her own accord, and if she kill *Reward* her.

There is more danger in heating a *Hawk* taken out of the *Mew*, than one newly taken being a *Ramager*; for the latter comes from her Exercise, and although she is fat, yet peradventure her *fat* and *flesh* is firm, and so made from her daily Exercise.

There is also more danger in a *Mewed Hawk* than in one taken out of the *Cage*; for though they are fat, yet their long Carriage by *Sea* and *Land* makes them less apt to *Bate*, and overheat themselves.

Those that are taken from the *Mew* get their Fat by ease and rest, so that when they are brought to eat they must be fed twice a day with good new *Meat* well washt and clean dresst, that all the *Blood* may be well wrought out. As to the quantity you may use your discretion, giving her enough.

For the first ten *days* after your *Hawk* begins to feed, give her neither *Stones* nor *Castings*, but afterwards give her every *Night* about half a dozen *Stones* after she hath put away her *Supper* from her *Gorge*, and you will find that she will have rendred them all again in the *Morning*.

The third *Week* begin to give her *Castings*, and so continue the same course for *dyet* and *feeding* as before directed, until she be fleeing: And all the time of her *feeding* add to her *Meals*, and forbear to wash altogether so hard, for it is careful and due *feeding* that makes her serviceable: Nor is there any *Hawk* but what will flee as she is taught; and if her *Stomach* be right, will flee with courage and attention to her *Keeper*.

After a long, tedious, and laborious flight, if you mistrust any *Grease* or uncleanness in her, give her *Plumage*, and *Blood* to content her, but not much *Meat*, half her usual *Gorge* being sufficient: Then when her *Meat* is put over, give her *Stones*, and set her up warm, and you shall find the *Stones* preserve her in a due proportion of heat for the present, which is very necessary for her, rendring her cool and temperate for the future.

To conclude; Concerning the giving *Stones*, you must use the *Stones* and *Casting* with discretion: The latter without the former in a *Hawk* (supposed to be clean) will work no effect, and thereby deceive you. For Example: Give such a *Hawk* as you suppose to be very clean, *Casting* for a *week* together, and she will render it fair and white; and do but then give her some *Stones*, and then *Casting*, and you shall soon find some filth and glut which the *Stones* had made fit to remove by the *Casting*, and which without these *Stones* the *Casting* could not have wrought off.

Some times it happens that a *Hawk* may break out of the *Mew*, to regain, or find out the place where she *Percheth* in the Night, then take with you a dark *Lanthorn*, and at your approach hold the light to her, that she may not see your Face, but be employed in looking altogether on the light, which is accustomary to all *Birds*; then having espied her, climb up the *Tree* with as little noise as possible, ringing a *Low-Bell* at the bottom of the *Tree*, and holding the light towards her, until she is taken, which you may easily do; for she will hardly stir.

About a *Fortnight* or three *Weeks* before you intend to draw your *Hawk* out of the *Mew*, let her be fed twice a *Day* with clean dresst, and washt *Meat*; and you will find her thereby well advanced towards her *Enseaming*; She will likewise thereby have scowred out of her *Pannel* and *Gut*, much of that *Glut* and *Grease* which hath there engendred, which will prevent many Dangers, that might have befallen her through Heat, occasioned by the least stirring, or *Bating* in the time of her drawing out of the *Mew*.

Of Mewing at the Stock.

THE place for this purpose, should be a Ground *Room*, free from Noise; and there must be as many *Turfs* or *Seds* placed therein upon the *Ground*, as you intend to *Mew Hawks*; and let the Distances be so wide, as not to reach one another, Let the Ground be covered with *Sand*; and your *Turfs* must be raised so high one upon another, that your *Hawks Trains* may not touch the *Ground*.

For the fasting her to the *Turf*, put a Stick through the middle of the *Turf*, so that about two Inches of the Stick is beyond the *Turf* at each end; then fasten your *Hawks Lease* to the one end, and draw it over the top of the *Turf*, with a *Swivel* fixed in the middle of the top of the *Turf*, and drawing it hard, fasten it to the other end of the Stick; then fasten your *Hawk* by the *Jesses*, to the upper part of the *Swivel*, which will give her leave to bate round about the *Turf*, but not to get off; and as oft as your upper *Turf* grows dry, supply it with fresh.

Note that all *Gerfalcons* and *Jerkins* are to be *Mewed* this way, and not loose, as also all *Haggards* are unquiet in the loose *Mew*.

Every *Morning* when the *Falconer* comes to feed the *Hawks* thus *Mewed*, as he enters the *Room*, he must give them his Voice, that they may know of his Approach; then with a *Broom* sweep away all their *Mewtings*; and then Feed each *Hawk*, as usually. The *Sand* thus swept away must be renewed to keep all sweet and clean.

All *Hawks Mewed* this way, should have *Cophoods*, which are large and ease, which must be taken off about once a Fortnight, that nothing may hurt their *Eyes*.

Having Treated of the several sorts of *Hawks*; together with instructions for their *Feeding*, *Reclaiming*, and *Mewing*; the next business shall be to Treat of some Necessary things, fit for a *Falconer* to understand and observe.

CHAP. XX.

Necessary Rules for a Falconer to observe.

WHosoever intends to apply himself to this *Art*, and to become Master, must for some time bestow all his Care and endeavours therein; he must be diligent to learn, and observe the *Natures*, *Inclinations*, *Strength*, *Mettle*, and *Conditions* of his *Hawks*; he must Treat them with a Gentle and Loving Hand, and pass by their Faults with Patience: He must not be addicted to *Tables*, *Cards*, or playing of good fellow, for many an excellent *Hawk* hath been lost, through the intemperance of her *Keeper*, nor can he be termed a good *Falconer*, that is apt to be led away by these or the like Disorders; I grant he may be expert in *Reclaiming*, *Enseaming*, and *Fleeing* his *Hawk*, Nay, he may attain to great Skill in the Ordering and Managing her in her *Flights*, and whilst she is in the *Field*, but if then he betakes himself to the *Pot* and *Pipe*, when he is returned home, and peradventure to let his poor Tyred *Hawk* to hang by the Heels, such a one can't deserve the Name of a good *Falconer*. He that is a *Smoaker*, must not chew the *Hawks Meat* in his Mouth, for some good time after; For it will make her cast her *Gorge*, or stand upon her Meat, which will occasion a disorder unto her, if not kill her.

It is not enough that a *Falconer* knows how to Cure his *Hawk*, of any *Disease*, or *Distemper*, nor what *Remedies* he ought to use in such and such accidents; but his Care must be to preserve her from *Diseases* and ill *Accidents*, which he may in a great Measure perform, by Care and Diligence; for that *Phisitian* which prevents a *Disease*, is of more Esteem than he that Cures it.

He must be careful to keep his *Hawk* clean, and free from *Lice*, *Mites*, and the like *Vermine*, the first being in the Body; and the latter about the *Eyes* and *Nares*; and she must be in good Case as to State of Body, for a lean *Hawk* is subject to more Diseases than a Fat one, especially, *Lice*, and *Mites*; and yet a Measure ought to be observed in her *Feeding*, for if overfat, it hinders her Flight.

The place under the *Perch* should be often Gravelled, the better to discern by her *Casting*, when she hath need of *Scouring*, *Stones*, or the like.

Every *Morning* tye your *Hawk* out to weather her

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her; and those *Mornings* that she *Baths*, when she is throughly dry, give her some *Plumage*, or *Tyreing*, to prevent her catching Cold, and then she will be fit for Flying.

After you come from your Sport, set a *Candle* lighted by her, which will occasion her to *Rouze*, *please* and *Oyl* her self, where she sits *unhooded*.

Every *Morning* that you intend to Flee her, set her out Early to *Air*, or *Weather*, pulling off her *Hood*, for so long a time as she sits quiet, and then *Hood* her up again; and so let her sit till you go to the *Field*: And when you set her out to *Weather*, place her on a *Block* or *Stump*, about a Foot High, and tyed at half length of the *Lease*; and if there be more *Hawks* than one in a *Room*, place them so, that they reach not one another, as before directed.

Every *Night* after Fleeing, give them *Castings*, sometimes *Plumage*, and sometimes knots of *Flannel*, or *Feather Castings*, and sometimes *Phisick*, as you see occasion by their *Castings*, and *Mewts*.

Be Careful not to tye your *Hawk* too high from the Ground, for fear of *Bateing*, hanging by the Heels, or the like ill accidents, but set her low; and if there be more *Hawks* than one in the same *Yard* or *Garden*, place them so as not to reach one another.

The *Falconer* must be provided with *Copeing Irons* to cope the *Hawks Beak*, when it is overgrown, also *Cauterizeing Irons*, *Scissers*, *Bodkin*, and such like necessary Tools.

CHAP. XXI.

Terms of Art in Falconry.

THe First and Principal Term to be practised is, *Hold fast*; and that at all times, especially when she *Bateth* or *Striveth* to Flee away.

Say *Feed your Hawk*, and not give her *Meat*; and when she hath Fed, say she *Feaketh her Beak*, and not wipeth it.

She is *full Gorged*, not *Cropped*; and if her *Gorge* be void, and her *Bowels* any thing stiff, say she is *Embowelled*, and hath not fully *Endued*, and so long as you find any thing in her *Bowels*, it is Dangerous to give her Meat.

You shall say she *Jouketh*, and not *Sleepeth*, she *Pricketh*, not *Picketh* her self; nor can she properly be said to Prune her self, but when she begins at her *Legs*, and fetcheth out Moisture at her *Rump*, wherewith she *Oyleth* her *Feet*, and strikes the *Feathers* of her *Wings* through her *Beak*, which she doth after she hath been wet in a *Rainy Flight*: and when she *Pruneth* her self, do not disturb her, for then she sheweth her self to be Lusty, and of good Courage. When she has done *Pruning*, she will exceedingly rouze her self.

When she *Picketh* her self, say she *Pruneth* her self.

When she stretches one *Wing* and a *Leg*, she *Mantleth*, and when she lifts up her *Wings*, she *Towreth*.

To *Brayle* the *Hawks Wing*, is to put a piece of *Leather* over the Pinion of one of her *Wings*, to keep it close.

Say she *Rouzeth*, and not *Shaketh* her self.

If a Long *Winged Hawk*, say she *Mewteth*, and if a short Winged, she *Slieeth*.

Say, set your *Hawk* to the *Perch*.

Say she is a Fair, Long, Short, or Thick *Hawk*, and not a great *Hawk*; and she hath a Large, or Short *Beak*, and not a *Bill*.

Say she is full Gorged, and not Cropped.

Say she *putteth* over, and *endeweth*, but both in a divers Sense; for the *puts over* when she removes her *Meat* from her *Gorge* into her *Pannel*, by traversing with her *Body*, but chiefly with her *Neck*: She never *Endeweth*, so long as her *Gorge* is full at her *Feeding*; but as soon as she hath Fed and Rested, then she *Endeweth* by little and little.

When a Long *Winged Hawk* is Flown from the *Fist* at her *Game*, it is said *she goeth well Aforehead*; and after she hath laid in her Game, and betakes her self to her *Wings*, it is called *Flying*.

For a Short *Winged Hawk*, say *She goes well* from the *Fist*, and when she has laid in her *Game*, and taken her *Stand*, it is said she *goes well or nimbly at the Retrieve*.

Hawks have proper Names to their *Feathers*. Their Principal *Feathers* are six in each Wing, and Twelve in her *Train*; all the small *Feathers* (except her *Flag Feathers* under her Wings, which are Thin and *Broad*) are her *Plumage*; the first *Feather* in the Wings are the *Sarcel Feathers*, which she always casts last, when she is in the *Mew*; and then, and not before is the proper time to Feed her with *Wash't Meat*; and begin to *Enseam* her, that is, to take away her *Grease*, for Wash't Meat purgeth her. There are other *Feathers* that close up the *Sarcels*, and those are termed the *Covering Feathers*, as are all the *Feathers*, which are next over the long *Beam*, and *Flag Feathers*.

When she *Picketh* her self, say she reformeth her *Feathers*.

Say she *Collieth*, and not *Breaketh*; She *Straineth*, not *Glitcheth*, or *Snatcheth*.

When she waits at the place, where she lays the *Partridge*, or other *Game*, until she be retrieved, say *she keeps her Mark*.

A *Hern* that stands by the Water Side, watching for her Prey, is said to stand at *Seidge*.

When a *Hawk* goeth forth at *Check*, it is termed *she maketh out*.

When she *Groweth Fat*, say she is *Raised* in *Flesh*.

CHAP.

CHAP. XXII.

Concerning the Diseases of Hawks, *with proper Cures for the same.*

Diseases are easier prevented than cured; every one therefore that intends to keep *Hawks* should be well advised in the first place how to preserve them from *Sickness* and *Maladies*, which is of greater concern than to cure them when distempered.

In the next place, if any *Hawk* hath any *Sickness* or *Malady*, provide timely *Remedies*, not permitting them to run on too far: And in the last place you must be furnish't with *Medicines* proper for the *Distemper*.

Accidents will unavoidably happen, and then your *Art* and *Care* will be required to cure them with the greatest ease, safety, and quickness.

Diseases and inward *Infirmities* do send forth certain previous Symptoms, whose progressions may be impeded by a timely application of necessary *Remedies*.

I shall give you some *Instructions* how to cure those *Distempers* that *Hawks* are most subject unto, especially at the time of their drawing out of the *Mew*, being then very fat and full of *Grease*, unless you order them accordingly: And withal, being full of courage and wild, they are apt to over heat themselves by *Stirring*, *Bating*, *Resisting*, *&c.* and if you do not prevent the ensuing Evils your *Hawk* is utterly lost; for it is impossible to cure her of these Infirmities whilst she is in her *Grease*. If therefore your *Hawk* be of great Mettle and Coy, wash her with cold Water, which will much refresh and cool her before she begins to *Bate*; for after she hath heat her self, then too sudden excess of Cold will clog her up. The Heat will melt her *Grease*, but the Cold will congeal it, which of the two Evils is the greatest.

Also it is not good to make too much haste in the *Enseaming* her, nor to disperse her *Grease* too soon, for that takes away her *Stomach*, and causeth her to cast disorderly: Likewise it is the occasion of abating her Flesh, which bringeth weakness of Body, from whence proceeds the *Cook* and many other *Diseases* difficult to cure.

The wild *Hawk* preserveth her self at all Times and Seasons in a moderate State by her continual *Exercise* and good *Feeding*. She liveth longer than the Reclaimed ones, and takes greater pains for her living, being her own *Caterer*; and if at any time she finds her self oppressed with roughland ill Humours, *Glut*, *Grease*, *Fat*, or the like, Nature has taught her (as indeed all Creatures) to be her own *Physician*, and to make choice of her own *Medicines*, which are no other than fair *Water* and *Stones* or *Gravel*. It were well if all Men would observe such a course when their *Hawks* are out of order; for certain it is, if these things will not cure and prevent *Diseases*, if timely taken, wherewith your *Hawks* Stomach is naturally inclined, then be confident that no *Drugs* or *Medicines* will effect the Cure. I hold therefore that all Sophisticated *Scowrings* are not only unnatural, but insignificant to the end for which they are intended. I must confess in appearance they may seem to remove some inward *Diseases*, but they do it not effectually, for they return again. But for such that will be perswaded thereunto, I shall lay down some *Scowrings* or purging *Medicines*, with the true manner how to administer them, and how to prepare your *Hawk* for receiving them, that they may be the more effectual.

Of Scowring and Purging Medicines.

A Strong and full *Hawk* shall be exercised with *Courage*, clean *fed*, *Stones* and *Castings*, at least eight days, to stir the Humours in her Body, and make them fit to be wrought upon. You must then feed her in the *Morning*, only upon that day that you intend to scowr her, that she may be empty at *Night*; then give her *Scowring*, and set her up warm: early the next *Morning* give her *Stones* in this following comfortable Water.

Take a *Pint* of clean *Water*, put therein six bruised *Cloves*, as many thin slices of *Liquorice*, with some brown *Sugar Candy* dissolved; when she hath cast her *Stones*, give her a little good *Meat* to her Breakfast. The said *Water* is very pleasing and grateful to the *Hawk*, and withal strengthening, and exceeding good for any *Hawk* that is poor and low.

For your strong and full *Hawks* this is a most excellent *Scowring*; Take a quarter of a Pound of fresh *Butter*, and four Spoonfuls of *Whitewine Vinegar*, boyl them gently together, scum and clarific it well, and then add to it three or four bruised *Cloves*, a branch of *Rue*, and one of *Wormwood*, a blade or two of *Saffron*, and a piece of *Sugar Candy*; let all these boyl a little together, then take the *Saffron*, *Cloves*, *Rue*, and *Wormwood*, when the remainder is cold, drain off the *Vinegar*, and make up the Substance into small *Pellets*, and being rolled up in *Sugar Candy*, give to each *Hawk* two of them; and as to the bigness, you may proportion them to the size of your *Hawk*.

If it be not strong enough at the first giving, at the second time convey into one of the *Pellets* the quantity of a *Tare* of clean unwash't *Aloes*, which will work very kindly. This *Scowring* is good for a *Surfeit*, and for one that has long continued in a foul and disorderly *Feeding*; it purgeth the *Stomach*, killeth *Worms*, restoreth *Rottenness*, strengtheneth the *Heart*, and comforteth the *Head*.

If your *Hawk* be but in a reasonable state of Body, and you mistrust some inward Infirmity, then take a quarter of a Pound of sweet fresh *Butter*, let it boyl by it self, scumming it well, then put into it three or four small branches of *Rosemary*, two or three bruised *Cloves*, a little *Mace*, a little *Saffron* in Powder, and a pretty piece of brown *Sugar Candy*, and boyl all these together very well: In the boiling put in a little Powder of *Rue*, and mix them altogether very well; then take out the *Cloves*, *Mace*, and *Rosemary*

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mary. You must give the same in quantity and manner, both for *Time*, *Preparation*, *Dyet*, *&c.* as before directed: And if you find it not strong enough, put into one of the *Pellets* a small quantity of *wash't Aloes.* This *Scowring* gently purgeth, strengthens the *Heart*, preserves the *Lights*, and removes *Stoppings* and *Obstructions.*

A *Hawk* in a low estate and weak, must be ordered in another manner: For whereas you gave your strong *Hawks scowring* at *Night*, you must give it a weak one in the *Morning*, and feed her the *Night* before with good *Meat*, that she may put it kindly away, and be empty betimes in the *Morning*; then give her the *Scowring* you intend, and set her on a warm *Brick* wrapt up in a double *Woollen cloath*, and there let her stand about three *hours*, until she is fit to Feed, and then give her a little that is good, *feeding* her by degrees, not all at once; and be sure to give her of the *Water* already prescribed.

If you Order and Dyet her in this manner, that is, with good *food*, moderate *warmth*, and due *care*, no doubt but that she will regain her former health.

I shall add this compound *Scowring*, which is very good for any *Hawk* in what *state* and *condition* soever.

Take a good quantity of *fresh Butter* well boyled, clarified and wash't in *Rose-water*, then make it up with the Powders of six *Cloves*, two or three *blades* of *Saffron*, the quantity of a small Nutmeg of *Rue* in *Powder*, with good store of *Sugar Candy.* Being kept close stopt or covered in a *Box*, it will keep a long time, and you may give it your *Hawk* as occasion requires.

You may Feed within about an *hour* after it, and it will make her very fond of you, full, haughty, and proud: It prevents the *Wind*, openeth *Obstructions*, purgeth the *Head*, warmeth the *Body*, comforteth the *inward Parts*; is good against shortness of *Breath*, and is a present Remedy for the *Cray* and *Pantas.*

I shall now give you an excellent *Scowring* for a full bodied *Hawk* after she has been *Lured*, and her *Grease* and *Heat* stirred in her before she be throughly *Enseamed.* Take some *sweet Butter*, clarifie it well, and put thereto the Powder of *Box-leaves* and *Rosemary*, of each a like quantity, a little Powder of *Horehound*; mix all these very well together, and make them up into small *Pellets* with brown *Sugar Candy*: Give your *Hawk* two of these *Pellets* at *Night*, as before directed, and it will purge and scowr the *Pannel*, and other inward Parts of *Grease*, and the like Humours, and will cause her to *Enseame* very well.

I shall now add something concerning simple *Scowrings*, amongst which that which we call *Casting* is one. For a *short winged Hawk*, the soft *Feathers* of small *Birds*, with some part of the *Skin*, is very good and natural. And for a *long winged One*, fine *Flannel* cut into pieces about an *Inch square*, rolled up, and given in a bit of *Meat.*

By these you shall know in what state your *Hawk* is in; for when she hath returned them, if you find them *hard*, *white*, and *round*, not *stinking* or very *moist*, and if upon pressing or squeezing it betwixt your Fingers, you find clear water come forth, 'tis a sure sign she is *well* and *lusty*: But if it be long, with contrary properties, as *black*, *green*, *yellowish*, *slimy*, *greasie*, or *stinking*, it denotes her *diseased.* The former *Casting* is remedied by hot *Meats*; the latter by *feeding* her well, and *washing* her *Meat* in cool Water, as of *Endive*, or the like; and give her one or two *Castings* of *Cotton*, or *Flannel* mixt with *Incense* and *Mummy.*

There is another gentle simple *Scowring*, and that is the Root of *Sellandine*, of which four or five small *Pellets*, given out of the Water early in the *Morning* (your *Hawk* being fasting) will finely cleanse her; but it must be given to a strong *Hawk*, as being a strong *Medicine.*

Before you give any *Scowring* to a *Hawk*, know the state of her Body, and accordingly make and order it, observing the Time and Season.

Casting of *Plumage* is to be observed as the former *Casting*, that is, if in the *Morning* you find them round and not stinking, it shews *health* and *soundness*: But if long, slimy, with undigested Flesh sticking to it and stinking, it denotes *Diseases* and *Unsoundness.*

Mewts as well as *Castings* must be observed, being of such importance for the knowing the state and condition of your *Hawk*, that they ought to be regarded every *Morning.*

If the *Mewt* be white without black spots, and not very thick, it is a sign of health; but if white and very thick in the middle, it signifies that she is gross and full of *Grease*: And this may be remedied by giving her moist *Meats*, as *Lambs*, *Sheeps*, or *Calves Hearts*, and the like: And for two *Mornings* after (being empty) give her *Sugar Candy*, and this will scowr her.

If the *Mewt* be more yellow than white, it is a sign she abounds in *Choler*, occasioned from great Flights in hot weather, as also from much *Bating.* This is cured by washing and wringing her *Meat* in *Buglosse*, *Endive*, *Borage*, or the like cool Waters, and to wring it in a *Linnen cloath* after it is wash't.

The *green Mewt* denotes an infected *Liver*: For cure, feed her with *Meat* powdred with *Mummy*; if she will not take it so, give it her in a *Scowring* or *Casting*: And if this will not soon effect the *cure*, then give her a *Scowring* of *Agarick*, and then another of *Iucense* to comfort her.

The *Mewt* full of several *Colours* is very bad, and a speedy course must be taken by giving her purified *Mummy* beaten to Powder, wrapt up in *Cotton.*

The *black Mewt* proceeds from an infected *Liver*, and is very dangerous, so that it will kill her in a few days if it continue: For *cure*, give her good *warm Meat*, and *Cotton Casting*, with the Powder of *Cloves*, *Nutmegs*, and *Ginger*, or *Mummy* alone.

The *dark sanguine Mewt* with *black* in it, is the most dangerous and hardly curable.

Concerning the choice of *Stones*, the number, and the bigness of them, use your own discretion with due regard to your *Hawk*; for seeing you shall seldom see two of one kind exactly to agree in proportion and nature, therefore regulate your self according to discretion.

The *Stones* most proper are a sort of fine *white Pibbles*, commonly found in the *Sands* and *Gravelly Rivers*, the rougher they are the better, provided they are not gritty.

To a *Falcon Gentle* give about seven *Stones*, and seldom above nine. To a *Merlin* and *Hobby* not above five or six; and so to other sorts proportionable to these, and be sure to give them the *Stones* always clean washt and free from filth.

If your *Hawk* cast her *Stones* disorderly, keeping all or some of them longer than she should, be then well advised how to proceed with her. This ill property is occasioned through sudden *Colds* after *Heats*, before they are perfectly *Enseamed.* For Cure do not use striving with her, lest you bring her down from her *flesh*; but give her *Stones* out of *Fair-water* at due times and often, and not in the *Morning*, for by that means you will often be constrained to keep her often Fasting the whole day in expectation of them, as being pleasing to her; but at Night, which is the best time for quietness, and then she will have time to receive the true operation of them.

You must not give *Stones* to a sick *Hawk*, which is not of strength to return them; but to a strong one at Night, and you will not fail to have them again in the Morning: And if she should not have rendred them, yet feed her, and use this constantly but a little while, and you will *Reclaim* her to cast them duly.

Of Worms, and how to destroy them.

HAWKS are oft troubled with *Worms*, and there is a sort called the *Back-Worm* of about half a yard long, which trouble them, and will in time kill them; It proceeds from gross and viscous Humors in the *Bowels*, occasioned through ill Digestion and want of Natural heat.

This *Back-worm* is rarely quite killed; but a careful *Falconer* by giving her *Cloves* of *Garlick* steeped in *Wormwood* once a *Month*, and once a *Fortnight* against his putting her into the *Mew*, will qualifie the *Worm* so as not much to hinder her Fleeing, and without this care she will suddenly be spoiled.

This Distemper is easily discerned by these Symptoms, *viz.* by her stinking *Breath*, her *Casting* her *Gorge*, her *Croaking* in the Night, her trembling and writhing her *Train*, her *Mewting*, which is small and unclean, and also by her keeping at a stay in a low state of Flesh.

This Distemper may be cured these three ways; first, Take *Pressure* made of a *Lamb* that was slinked, and make thereof two or three pieces, which put into the Gut of a *Dove*, or the like *Fowl*, and feed your *Hawk* therewith at such times as she is empty, and keep her fasting about two *hours* after. Secondly, Provide a *Glass* full of the Juice of *Wormwood* when it is green, and in its greatest strength, and put therein twenty or thirty *Cloves* of *Garlick*, as many as the Juice will cover, being first clean peeled and pierced through; keep them close stopt, and when you have use for any, give her one at a time for three or four days at Night for her *Supper*, having first made them clean and dry on the out-side, and let her have Water offered her every Morning afterwards; and when you give her her *Supper*, roul up two or three Bits of Meat in *Mustard-seed* unbruised, and let her eat it: Her *Casting* at this time should be *Plumage.* Thirdly, Your *Hawk* may be cured by a Scouring of washt *Aloes*, *Hepatick*, *Mustard-seed* and *Agarick*, of each an equal quantity; and with these *Medicines* you need not fear the destroying of them at any time. And if she void *Worms*, take fine *Filings* of *Iron* and strew it upon her Meat for two or three days, and it will cure her.

Of the Filander, or Back-Worm.

THis is a Distemper about the *Reins*, being very small *Worms*, which lye wrapt up in a thin Skin near that part; this *Disease* makes her poor, and if not timely prevented will kill her. The Signs of this Disease are her Poverty, her ruffling her *Train*, and her *Croaking* in the Night. This *Disease* is cured as before directed for the *Worms*, and feed her not in about two hours after; let it be warm and not much; and be sure too keep her warm all that day, lest she take cold. And it were not amiss if you gave her a *Clove* of *Garlick* so steeped in the Juice of *Wormwood* once a *Month*, being a great preserver of health, and prevents divers Distempers that *Hawks* are subject unto.

There is another sort of *Filander* that lies in the *Gut* or *Pannel*, being long, small, white and red *Worms*; For Cure, take *Aloes*, *Epatick*, *Filings* of *Iron*, *Nutmeg*, and so much *Hony* as will serve to make them into a *Pill*, which give her in the *Morning* so soon as she hath *Cast*, and after she hath *Mewted* it clean away give her good hot *Meat.*

Certain Rules to be observed to keep all Hawks in good health.

FIrst, Never give them a great *Gorge*, especially of gross *Meat* that is hard to be *Endewed* and put over, as *Beef*, and the like; but if in case you are constrained thereunto, then let it be first soaked well in clean Water and well wrung out; and observe if it be in Summer the *Water* must be cold, but if in Winter then *luke-warm.*

Secondly, Do not feed them with the *Flesh* of any Beast lately gone to *Rut*, being dangerous.

Thirdly, Though washt Meat keeps them in health, yet it is not so hearty as that of *Fowls* newly killed, nor is it so grateful to them.

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To preserve a Hawk in the time of her Flying, and to keep her in health.

Give her every *Fortnight* in the *Morning*, and after her *Casting*, *Aloesticcatrine* about an *Horse-Bean* wrapt up in a little piece of *Flesh*, or in the Skin of a *Hen*, that she may not taste it, and carry her on your *Fist*, the better to keep her from *Casting* it too soon; then set her in the *Sun*, or by the *Fire hooded*, and about two *hours* after give her a reasonable *Gorge* of some live *Bird*, or *Fowl*.

To help a Hawk that Endeweth not, nor putteth over as she ought.

This is occasioned by a *Surfeit*, from being foul within, or else being over-*Gorged* when she was poor and low, through too overmuch haste to set her up, which is a great fault in many *Faulconers*.

To Cure this *Disease*, feed her with light *Meats*, and a little at a time; also if you feed her with *Flesh* of *Fowl*, first steep it well in the Blood thereof, which will cause her to mount her Flesh apace. And it were not amiss if you gave her a scouring of *Pills* made of *Beef-Marrow*, *Saffron*, *Sugar* and *Lard* mixt together three or four Mornings, giving her a reasonable *Gorge* about two hours after.

Directions to preserve a Goshawk in the time of her Fleeing, especially in hot Weather.

Take a Pint of Red *Rose-Water*, put it into a Bottle, bruise a Stick or two of *Liquorice*, and put it therein, as also a little *Mace*, with the quantity of a *Walnut* of *Sugar-Candy*. In this Water draw her *Meat* through two or three times a *Week*, as you find occasion. It prevents the *Pantas*, and several other *Diseases* they are subject unto; besides it gives a great Breath, and gently Scours them.

To raise a Hawk that is poor and low.

This is occasioned by an ill *Faulconer*, in not feeding and ordering her well to prevent Distempers, or else by *Soaring* away, and being left for some time to seek her own *Prey* she becomes Poor and Low.

To raise her up, feed her but a little at a time and often, with good Meat of a light Digestion.

If she hath lost her Stomach, either by taking too great a *Gorge* in the Evening that she can't well *Endew*, or by being foul in the *Pannel*, or having taken a Cold; Take *Aloesticcatrine*, boiled *Sugar*, and *Beef-Marrow*, of each a like quantity, mix them and make them into *Pills*, which give her, holding her in the *Sun*, or by the *Fire* in Cold Weather, until she hath cast up the filth and slime within her, and feed her not until Noon; and then give her *Pigeons*, small *Birds*, or the like *Meat*.

Of the Frownce.

If your *Hawk* hath the *Frownce*, it proceeds from moist and cold Humors, either from the *Throat*, *Stomach*, or *Liver*, and thereby lose their *Appetite*, and can't close their *Clap*. It is called the *Eagles Baue*, as being commonly the cause of her death. The usual Signs of it are, her *Mouth* will be continually furr'd and frothed with white, and her *Tongue* swoln; and if it proceed from the *Throat*, it may be seen and dreit: And then do thus; Take a Sawcer of good *Whitewine-Vinegar*, put therein three or four Red *Sage-leaves*, and boil them pretty well; then take a little Powder of *Burnt-Allom*, which put into it, suffering it to boyl a walm or two, and so put it into a *Vial*, and keep it for your use.

If you find the *Frownce* to be *Rank*, Take the Flower of *Brimstone* a small quantity, tye it close in a *Linnen-Cloth*, and let it infuse in *Vinegar* four and twenty hours; then strain into the *Vinegar* as much of the *Juice* as you can get out. Having thus made the *Medicine*, cut or pare off with a *sharp Knife*, or a Pair of *Scissers*, which you find most convenient, the Scale of the *Frownce* to the quick, and with the tip of the *Feather* lay thereon two or three drops of the *Vinegar* made luke-warm in a Spoon. Do the like the second day, and afterwards but once in three days. Keep your *Hawks Mouth* open with your *Finger* for some time, after you have touched the Sore place with the *Vinegar*, that she swallow it not down.

If the *Frownce* be very foul, so that it is as big as a *Nut*; then it must be slit with your *Incision Knife*, and afterwards cut all out, cleansing the *Blood* away with a clean *Cloth*; then anoint the Sore with *Balm*, and afterwards with *Popelion*.

If the *Frownce* proceed from the Stomach, *Stones* and *Casting* will soon discover that, and recover her.

If it lye in the *Liver*, there is no way more certain than to give her *Stones* out of *Sorrel-Water*, and some of the Water with them; give it also with the Meat you feed her with, which must be such as is easie of Digestion. Her *Gorges* should also be easie and often.

If you infuse into the *Sorrel-Water* a thin slice or two of *Rhubarb*, it is excellent to cool all the Inflamations of the *Liver* in a short time, and to set her sound and right; but not without due care and ordering, for a Neglect will endanger her, and create new Troubles.

Of the Pin.

This *Disease* troubles *Hawks* as it doth *Chickens*, and proceeds from cold and moistness in the *Head*, or from feeding on gross Meats, not well washt in cold Water in the *Summer* and warm in the *Winter*.

For

For *Cure*, First give her a *Scouring-Pill* made of *Agarick* and *Hierapisra*, for two or three days together, with her *Casting* at Night, which will cleanse her *Head*; then *wash* her *Tongue* with *Rose water*, and anoint it three or four days with Oyl of *sweet Almonds*. When you see the *Pin* to be white and soft, being then throughly ripe; slit it and take it off with the end of a sharp *Awl* or *Bodkin*; then anoint the place two or three times a day with the said *Oyl*, until it be cured.

Of the Pantas.

This is a dangerous *Disease*, and esteemed not curable, if not timely taken: It is easie at first to be found out, for after a little *Bating* she will begin to fetch her Breath thick, with panting; and as it increaseth she will shew it more by labouring in her *Pannel*, even as she sits still on the *Pearch*; and will be forced to Gape for Breath; but when it is come to this height it is incurable.

This *Disease* proceeds when the *Lungs* are over dryed with heat, so that the Heart wants the refreshing that the *Lungs* give it, which are the Bellows to draw in the *Air*; and this *Disease* is the same with a Broken Winded *Horse*.

The *Pantas* doth proceed from two Causes, *viz.* from Heat and Drought of the *Lungs*, which is very hard to be Cured; and from some *Grease* or tough matter setled in the *Pannel*.

For *Cure*, Take a Quarter of a Pound of sweet *Butter*, put it into *Damask Rosewater*, in a *Viol* close covered; and when you use it, which must be very often, take a little thereof, and put thereto a little Powder of *Rue*, and the Powder of *Saffron* mixt well together, and made into *Pellets* rolled in *Broken Sugar Candy*, and give her two of the *Pellets* every Morning for a *Week* together, keeping her constantly warm.

If you give her a Scouring of *Sellandine* steeped in *Oyl* of *Roses*, and wash her *Meat* in *Colts foot-Water*, 'tis very good, for the first coming.

Of the Crock, and the Cramp.

There are some *Hawks* that are apt to have the *Crock*, and *Cramp*; and although they are of two Names, yet they are of one and the same Nature, being both occasioned by suddain Cold, after labour and Heat, either in Flying strong Flights before she is clean, or *Bating*, the former though well *Enseamed*, the latter before it; By this you may know how to prevent it. Be sure then to keep your new drawn *Hawk* from overheating her self by striving, and if she doth not, wash her suddenly, but keep her moderately warm. And as for your *Enseamed* and *Fleeing Hawk*, set her not carelesly down on any cold place, after hard Labour, but cherish her and keep her moderately warm; for through Negligence a *Hawk* gets both these distempers, so as to lose the use of her *Joynts*; and in this Case expect no Cure.

The *Cramp* most commonly comes after the *Crock*, and is a General Convulsion of the *Nerves* and *Sinews* of the *Feet*, *Legs*, and *Thighs*; and is Cured by Warmth, and inward Gentle *Scourings*. This *Disease* seizeth on the *Limbs*, and is easily to be discerned by the Contracting and Extending of them. For *Cure*, there is required *Rest*, *Heat*, and these following Directions; Fill a larg Brass *Pot* or *Kettle* with clean Water, into which put three handfulls of Red and White *Sage-leaves*, with as much *Polipody* of the *Oak*, and let them Boil together, then cover the *Pot* with good store of *Cloths*, and set your *Hawk* thereon. She must not be Over-heated, but moderately warmed, neither must you suffer her to be suddainly cooled: You should also give her every *Morning* a Clove of *Garlick*, for Seven or Eight days together, to expel the inward Cold, and open her *Pipes*. You should also shred very small, a little *Rue* and *Wormwood* mixt with sweet fresh *Butter* and *Sugar Candy*, and make it up into *Pellets*, and give her one or two for three *Mornings* in a Week; likewise now and then take out of the Pot some of the *Sage* and *Polipody* very hot, to lay before her *Nares*, that she may be fumed therewith; some for the *Cramp* will only let *Blood*, that *Leg* or *Foot* which she holds up or resteth upon the other; and if she doth but intermissively, then both, which hath often proved effectual.

For the *Crock* you may easily discern it, both by your *Eye* and *Ear*. It is so termed from her *Croaking*, or making a hoars Noise with her Wind from her *Throat*; and if it be after she is *Enseamed*, give her Rest, and this following *Medicine*: Take a Pint of *Claret*, put therein a little *Sugar-Candy*, three *Slices* of *Ginger*, and as much bruised *Cloves*; and let this stew or infuse over a gentle *Fire*, close covered with another *Dish* of an equal Bigness; this upper Dish must be often taken off to wipe away the moisture with a Feather, and therewith give her some with her *Meat*, as oft as you Feed her, and be sure to keep her warm. If it be taken before she is *Enseamed*, it is so much the worse, yet curable, if the *Cramp* is not also in her.

For Cure, Dyet and order her for quantity and continuance with the Scouring mentioned aforesaid, wherein the *Wormwood* and *Rue* are mixt together; and you need not fear her recovery, with due care in the observance thereof.

Of the Rye.

This *Disease* proceeds from suddain Cold, after Heat and labour, like as the two former, it produceth a continual stopping in the *Head*, which in a little time causeth the *Frownce*, or a perpetual moist, dropping Humour very hard to be Cured.

For preventing this *Disease*, do not set her on any cold place, as the Ground, or in any low Damp Room; but on a Warm Dry *Perch*, which at such times should be a little higher than usual.

The *Cure*, if timely taken, is by giving Rest, and keeping her warm, by orderly *Feeding* with these Directions. Her Food should be opening and

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and easie of Digestion, hot and moist; and if you sometimes gave her at her *Meals* two or three bruised Blades of *Mace*, it would do very well. You must also give her constantly with her *Meat* some of the Confection a little before prescribed, *viz. clarified Butter*, with *Rue*, *Saffron*, and *Sugar Candy* in Powder, finely made up in *Pellets*; also give her good store of *Plumage*, and keep her warm. They will loosen and open her, and cause her to throw with her Head, and when once she comes to that, blow the Juice of *Dazy Roots*, with a Quill or Straw into her *Nares* an hour before you feed her; and thrice a week in the *Mornings* blow the Juice of *Sage* into her *Nares*: These are both good to purge away tough, slimy, and corrupted congealed filth, the *Body* being predisposed to evacuate it.

Of the Cray.

THe *Cray* with the Cure is almost the same with the *Pantas*, and proceeds from cold, but it is through ill *Dyet* and long *feeding* with cold *stale Meat*. The *Symptoms* are these: Her *Mewings* will not be plentiful, nor will they come freely and with ease from her, she will drop some part thereof short and dispersed, and her body will be bound, and as it were dried up and clung. It is soon discovered, and as soon recovered, if timely taken. You must first remove the cause, her *Dyet* must be high, easie of *digestion*, and cooling *Meat*, such as young *Rabets*, *Chickens*, *Sheeps hearts*, and the like: Also use her to your Confection of *fresh sweet Butter* made up with *Rue*, *Cloves* and *Mace*, and anoint her *Meat* therewith. These things will cure the *Distemper*; for it openeth her Body, and cleanseth her of those indigestions and burning heats which afflict her, and which in a little time will kill her.

It were not amiss to give her with her *Meat* sometimes of the distilled Water of *Sorel*, *Woodbine*, *Horehound*, and the like cooling, cleansing, and opening things.

Diseases of the Liver and Stomach.

IF you think your *Hawk* hath any obstruction in her *Liver* or *Stomach*, or that she hath any inward *Disease* which you know not how to remove, you must be quick with her; for if for all your care in *feeding* and *keeping* her she continues at a stand, or rather falls back; or if she sits broody and crowching with her *Feathers* displayed, doth sometimes start and jerk out with her *Leg*, and the like usual Motions, questionless she has some Distemper that lyeth lurking in her. Now to try if it lye in her *Stomach* only, give her this insuing *Purge*. Take some clarified *Butter* that is kept in *Rosewater*, then mince a little *Rue* and *Wormwood* very small, which mix in the *Butter* with Powder of *Sugar Candy* together, with a little *Myrrh* finely beaten: These *Ingredients* make up into *Pellets*, and give your *Hawk* once in a *Morning*, and it will finely cleanse her, and is excellent for any Stomach *Disease*.

If the *Distemper* lye deeper, then *wash* her *Meat* in *White-wine*, in which infuse a small slice of *Agaric*, and the like of *white Ginger*: You may make it stronger or milder, as you see occasion; and you may also give her a small quantity of *Agaric* in Powder.

If still you perceive the *Disease* to lye further in, you may conclude it is in the *Liver*, and that occasioned throw ill *Dyet*, *Heats*, *Colds*, *Surfeits*, and the like; therefore forbear to give her any dry and hot *Meat*, I do not mean warm *Meat*, for that you must give her and none else; but I mean such *Meat* as is hot and dry in its nature and operation, and such as are old and hard of digestion. You must alter her *food* every day, sometimes one thing and sometimes another, and not two different sorts at a time; and give her *Castings* and *Stones* with moderation. In case you find her *Mewts* and *Castings* to be *greenish* in some places, and *yellowish* in others, it is a complication of *Distempers* in her *Gall* and *Liver*. Now all *Hawks* are subject to the over-flowing of the *Gall*, which being discernable at first, is easily cured, if you wash her *Meat* in distilled Water of *Liverwort* sweetned with *Sugar Candy*; and now and then, either at *Morning* or *Evening*, convey the Powder of three or four *Cloves* into a bit of *Meat*, and give her; it will allay and cool all *Inflamations* proceeding from the *Liver*.

If you infuse a little slice of *Rhubarb* in the distilled Water of *Endive* and *Succory*, or one of them, it will cool the heat of the *Liver*, and cleanse all *Distempers* of the *Gall*; the weight of two Grains of *Wheat* of *Rhubarb* in Powder given to a *Falcon*, and so proportionable to other *Hawks*, is an excellent *Purge* for all ill Humours proceeding from the *Gall*: But then you must afterwards in three or four *days* give her a gentle *Scowring* of some one of these prescribed in the beginning of this Chapter of the *Cures* of *Hawks*.

I shall only add this *Water*, which is approved excellent for any inward *Sickness*, proceeding from heat and drought, the Symptoms of which are very apparent; for her *Countenance* will be heavy, she will have a ratling in her *Throat*, and her whole *Body* will be inflamed, as if it were in a *Fever*; for which there is no better Remedy than this following *Receipt*. Take two Ounces of *French Barley*, wash it well, and put it into a *Pipkin* with about a Pint of clean Water; let it boyl a little, then draw away that Water, and put more to the *Barley*, which must also boyl four or five walms; draw that also off, and pour in some more fresh Water, as before; but this last time you are to put in about a quart, which must be boyled until about half be consumed; then strain out the Water, and mix some *Sugar Candy* with it, and boyl both together a little. It will not hold good above four *days*, so that make it as occasion serves; and when you *feed* her, wash the *Meat* in this Water. It is also very good to wash her *Meat* in the *Waters* of *Horehound*, *Woodbine*, *Woodsorel*, or the like.

To

To comfort and preserve the Heart from any infirmity proceeding from heat.

TAke the *distilled* Water of *Burrage* and *Bugloss* mixt together, into which put half a dozen sliced *Cloves* to infuse, and in this Water wash her *Meat* that you give her once a *day*, and let her be quiet and at rest; her *feed* must be light, and not heavy of digestion; and give her but small *Gorges* thereof, for a great *Gorge* ruins her.

If the Head is stuft with a Cold.

TAke *Rosemary Leaves*, dry them, and beat them to fine *Powder*, which mix with the *Powder* of about twelve *Cloves* in clarified and preserved *Butter*, so made out of the *Rosewater* and *Sugar Candy*, and give it her in *Pellets* in the *Morning*, one or two at a time, and be sure to keep her very warm until she is recovered, which will not be long.

To scowr a Hawk before she is cast into the Mew.

IN *Luring* and *Flying* time, through foul *feeding*, *Hawks* ingender *Filanders* and many other *Distempers*, so that they must be scowred and cleansed before they are cast into the *Mew*; for which observe these Directions: First scowr her well according to the former Directions; also *Cope* her, and set her well in *Flesh*, and as near as you can let her be free from *Diseases*.

Observe that a *Haggard Hawk* must be cast into the *Mew* loose, unless she be one that will not be quiet, and then darken the *Room* so that she may only see to *feed*, and come at *Water* and *Stones*; and if that will not do, *Mew* her upon the *Stock*, as before directed.

When she begins to *Mew*, begin to tye her to the *Perch* or *Block*, as you do the rest; and after she hath *mewed* and comes to flee, let her stand on a *Block* or *Billet* cased.

In the same manner *Mew Gosshawks* and *Sparrow Hawks*, only they are not to be born on the *Fist*, but be at liberty in the *Mew*.

About fifteen or twenty *days* before you draw your *Hawk* out of the *Mew*, abate her *Diet*, the sooner and better to *Enseam* her; and she must be fed with washt *Meat*, to prevent many *Diseases* that may ensue.

Diseases and Infirmities incident to the Legs and Feet.

HAWKS are oft troubled with outward Infirmities in their *Feet* and *Legs*, which proceeds as well from their *Keepers* negligence, as otherwise; and that occasioned by setting them on the cold Ground, or in moist and damp places when they are heated by *flying*, or by *feeding* them with cold *Meat* which creates *Diseases*; also by Pricks of *Bushes* and *Thorns* as they fly after their *Game*, or for not rolling or lining the *Perch* with soft warm *Cloth*; for prevention of which be sure, that after her flying to quiet her on your *Fist*, and not on the *Ground*; for if you use her not to the *Ground*, she will not expect it.

When you find she has the *Cramp* in her *Legs*, take some *Piony-Roots*, dry them, and hang them in a little *Bag* all Night about her *Neck*, and by Day let it be held often to her *Nares* to smell unto.

If any *Knots* or *Knobs* hard or soft do rise on her *Feet* or *Legs*, stay not till they are ripe, but forthwith open them to the bottom with a sharp *Knife* the long way of the *Leg*, and not cross the *Sinews*, neither too deep, but enough to take away the corrupt *Flesh* or *Skin*, which is of a spungy, hollow substance: Then take some of the Water prescribed for the *Frownce*, and wash it therewith until it is cured. Some are of Opinion, not to open the *Knots* or *Knobs* at all, but only to anoint them with some mollifying *Oyntment*, and bind it over with a fine *Rag*.

If your *Hawk* hath got the *Pin* in her *Feet*, cast her gently and cut out the *Core* or *Corn* which ariseth in the *Balls* of the *Feet* of unquiet *Hawks*, whilst they are in the *Mew*; then have in a readiness a Plaister to apply thereto made of *Galbanon*, *white-Pitch*, and *Venice-Turpentine* spread on soft *Leather*, and so tyed as not to be removed; yet not so strait as to hurt her. She must stand on a *Perch* soft lined, must be kept warm, and dresst three or four times a *Week* until cured; and for *Cure* some will set them on *Salt*; but this is found an utter Enemy to it.

If by Accident your *Hawk* gets a *Sprain* in her *Feet* or *Legs*, 'tis soon discerned by its heat and burning: For *Cure*, anoint and rub the place *Morning* and *Evening* with Oyl of *Exeter*, binding about it a fine *Cloth* dipt in the said *Oyl*, and keep it warm and supple.

If the *Sprain* happen to be in any of the *Tallons* or *Pounce-Joynts*, take a *Copeing-Iron*, cut the *Tallon* to the quick, and let out a good quantity of the enflamed corrupt Blood, which otherwise would endanger the loss of her *Foot*.

You must stay the *Blood* by Searing the place with some *Iron* heated in the Fire, and then anoint it with the Oyl of *Exeter*, tying a Linnen-Cloth dipt in the said *Oyl* about the Sore, and over all the Finger of a *Glove*, with a Hole for the *Tallon* to come out; which *Finger* must be made fast with a drawing *Thread*, that you may open it every *Morning*, to convey three or four drops of the *Oyl* into it; and not to be forced to take it quite off.

If she hath got a Swelling through a *Blow*, *Bruise*, or other Accident on her *Legs* or *Feet*, Anoint the place with Oyl of *Bays* and *Brandy* mixt together, and for want of Oyl of *Bays* only with *Brandy*; then tye over it a *Cloth* dipt in the same, and over all a *Leather* to keep it warm. In all these cases give *rest* and due *feeding*, or all will be to little purpose.

Hawks are apt to have the *Gout*, especially such that are free mettled and strong *Strikers*:

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waisted, put therein the quantity of a *Walnut* of *Alom*, and a spoonful of *Honey*; let all boyl a little, and put it up for your use. With this *Water* lukewarm anoint with a *Feather* the parts afflicted, and it will strengthen any *Feather*, though never so bruised.

Diseases in the Head.

These *Diseases* do commonly come by giving them too great *Gorges*, and by foul *feeding*; for when she has too full a *Gorge* she can't well put it over, and endew it, and by lying there too long doth corrupt and stink, especially in those that are low and poor; and by reason of its so lying in the *Pannel*, Fumes ascend up into the *Head*, and so close and shut up her *Ears*, and the passages of her *Pipes* and *Head* that occasions swellings there.

Of the Apoplex, or Falling-Evil, in the Head.

This *Disease* commonly befals *Hawks*, by reason of too much *Grease* and store of *Blood*, or for that they have been set too long in the heat of the *Sun*, or have made too long a flight in the Heat of the *Day*, and forasmuch as they are accustomed to be full of *Grease* in the *Mew*. Therefore it is very good to give them, when they are empty above, a little *Lard* or *sweet Butter* soaked in *Rose-Water*, with a little *Sugar-Candy* beaten; but above all, 'tis good to draw their *Meat* through *Black-Cherry-Water*.

Of Apostumes in the Head.

HAWKS are troubled with *Swellings* in their *Head*, which is an ill *Disease*, and occationed by divers ill *Humors* and the heat of the *Head*. It is discerned by the *swelling* of the *Eyes*, by the *moisture* that comes from their *Ears*, and by their slothfulness. For *Cure* give them three or four *Mornings* (when they have no Meat to put over) a *Pill* of *Butter* as big as a *Nut*, well washt in *Rose-Water*, and mixt with *Hony* of *Roses* and fine *Sugar*. They must be held on the *Fist* until they have made one or two *Mewts*; Then take four *Drams* of *Rue-seed*, two *Drams* of *Aloes-Epatick*, and one *Scruple* of *Saffron*; all which beat to fine *Powder*, and mix with the *Hony* of *Roses* to make a *Pill*, which give them, and it will purge and scour their *Heads*, and about two *hours* after give them some good hot *Meat*.

When the *Nares* of your *Hawk* are stuft up with filth, after a convenient *Scouring*, take *Pepper* and *Mustard-seed* beaten to fine *Powder*, and put it into a clean *Linnen-Cloth*, and steep it a good space in strong *White-Wine Vineger*, and put some drops thereof upon her *Nares*, that they may pierce in, which will much scour her *Head*.

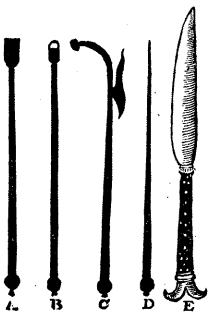
Of the Giddiness of the Head.

This *Disease* proceeds from foulness of the *Pannel*, or from a corrupt and naughty *Liver*; For Cure, give her a *Casting* of *Cotton*, in which wrap up a *Scruple* of *Aloes-Epatick*, and two *Grains* of *Cloves*; and two hours after her taking it, give her a young *Pigeon*, or some good *Meat*.

Of the Haw in the Eye.

This *Disease* comes from a *Blow*, but most commonly by the streightness of the *Hood*; it is discerned by a *Film* growing up from the bending of the *Beak*, and covering the *Eye* by little and little. For *Cure*, take a small *Needle* sharp pointed, and being finely *Threaded* take up the *Haw*, and neatly cut it with a sharp *Knife*, but cut it not too much; then wash it with *Rose-Water* for three or four *days* together.

Of Cauterizing Instruments to Sear Hawks in desperate Cures, being the last refuge.



The *Cauterizing Instruments* are made after the fashion of these *Figures*: That Marked *A* is to *Cauterize* the *Hawks Head*, being round and plain at the top. That Marked *B* is to *Cauterize* the *Nares*, being also round and hollow at the top. That Marked *C* is a *Cauterizing Button* to burn and sear the *Head*; and with that other device on the Back-side, to cut the *Skin* under the *Nares*, if need require. That Marked *D* is to *Cauterize* and enlarge the *Nares*, and is therefore made so small and sharp at the point, the better to enter the *Nares*: And that Marked *E* is the *Cauterizing Knife*, useful for divers occasions.

These *Instruments* should be larger or smaller, according to the proportion of the *Hawk*. Also besides these *Tools* a *Falconer* should have a Pair of *Scissers*, a *Splatter*, and *Cooping-Irons*.

Of the Canker that breeds in the Throat, and Tongue of a Hawk.

This *Disease* is bred through *foul Feeding*, and not washing their *Meat* in cold *Water* in the *Summer*, and in warm in the *Winter*, engendring in their *Guts* a gross slimy Matter, and being moved fumes up into the *Head*, and so distilling again engenders heat of the *Liver*, which breaks out in the *Throat* and *Tongue*, of which proceeds the *Canker*: It is easily discerned, for she hath much ado to swallow her *Meat*, and oft lets it fall. For *Cure*, take the *Oyl* of *Almonds*, or *Olives*, and anoint the *Throat* therewith two or three times a *day*; then give her *Sugar*, *Lard*, and *Beef-Marrow* for three *days* together, and feed her with *Mutton*, *Pullets*, or such like *Flesh*, dipt in the said *Oyl*. After this, when you find the *Canker* white, take a very sharp *Knife*, and slit or open it along the side of the *Tongue*, and softly scrape away the *Whiteness*; then take a little *Cotton* or *Lint* to dry up the *Blood* of her *Tongue*, and wash her *Meat* in the said *Oyl* until she is cured.

Of Broken Wings, Legs and Thighs.

If a *Hawk* breaks her *Wing*, take *Sanguis Draconis*, *Bole-Armoniack*, *Gum-Arabick*, *white Frankinsence*, *Masticke*, and *Aloesticcatrine*, of each a like quantity, with some fine *Meal*; of these make a *Powder*, and temper it with the White of an *Egg*, and make thereof a *Plaister*, and when it is right Set, lay on the said *Plaister* gently, and cross her *Wings* one over another, making her fast that she can't stir it, and remove not the *Plaister* in seven or eight days, nor stir the *Wing* when you lay on a fresh *Plaister*, and in about fifteen or twenty *days* it will be healed.

This *Medicine* serveth for her *Wing*, if out of *Joynt*, having first Set it, Splinter it up, and apply the *Plaister* as aforesaid. The like for the *Leg*, or any other *Limb* of her, always observing with great care to keep the place firmly bound (but not too hard) that it doth not come out again in the Dressing, or otherwise, until it will well knit.

Of Imping Feathers.

It often falls out, that a *Hawk* breaks her *Wing*, and *Train-Feathers*, so that others must be set in their stead, which is Termed *Imping* them; and this is to be done several ways.

For large *Hawks*, if the *Feather* is broak within a *Fingers* Breadth of the *Quill*, then *Shear* it off with a pair *Scissers*, that it may not cleave further; then having a *Feather* like it, cut the *Quill* off, and force it together, to enter the broaken *Quill*, anointing it with the Yolk of an *Egg*, before you thrust it in, or some kind of *Semond* made for that purpose, so that it may be as if were Grafted into it; and that it may have the better hold, fasten them together, by putting through them the point of a small *Feather*, as it were a *Pin*; which hole may be made through them by a *Needle*.

If a *Sarcel*, a *Flag*, or *Train-Feather* be broken or slived, so as an *Imped Feather* can take no hold; then take a *Juniper Stick*, or the like *Wood*, and make a small *Peg* thereof, so as to enter the *Quill*; then dip one end thereof in *Glew*, or *Semond*, and thrust it into the broken *Quill*, and place it so, as it may be without the *Quill*, and of a just Size to answer the length of the *Feather* before broken; then put the other end also in the *Glew*, or *Semond*, forcing it into the *Quill* of the *Feather*, that you have gotten so close, as the one *Quill* touch the other directly; then fasten and clint both the *Quills* to the *Juniper Peg*, with a small *Feather* as aforesaid.

If the *Feathers* are broken above the *Quill*, towards the Point of the *Feather*, two or three *Fingers* Breadth, cut it off with a sharp *Pen-knife* slopewise, and cut it in the like manner as you did the other, so as to fit well and close together.

By these Directions joyned with Experience, you may not only prevent, but Cure such Infirmities as your *Hawk* is Subject unto by Nature, or wherewith she is troubled by Accident.

I shall therefore Conclude this Chapter, with advise of using preventing *Medicines*, that is Care, Diligence, Circumspection, Fair and Gentle Usage, due Feeding, and right giving *Stones*, and *Casting* according to the Directions aforesaid; and then you will have little occasion to use any of the *Medicines* here laid down, although very good in their kind, whereby you will avoid much Trouble and Charge, besides the preserving your *Hawks love*, and your own *Recreation*.

CHAP. XXIII.

Concerning the Choice and Use of Spaniels, *their Qualities, Diseases, &c. with their Cures.*

Though you should have *Reclaimed* and *Mewed* your *Hawk* in all other *Points* to perfection, and be defective in that of the making her throughly acquainted with your *Spaniels*, you have bestowed your pains to little or no purpose; forasmuch as *Spaniels* are the chief *Instruments* which you are to use in this Recreation, as well for the Springing and Retrieving of *Fowl*, as otherwise; for until you have reconciled that natural averson that *Hawks* have to *Dogs*, and brought them to have boldness and confident familiarity to them, as

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well whilst they are in the midst of them loose, as when on the *Fist*, you may be said to have a *Hawk* and no *Hawk*. Now for the better effecting the same, at every Feeding time after your *Hawk* is a little acquainted with you, and that she begins to be at command, to understand the *Lure* and your *Voice*; then draw your *Dogs* together (at least three Couple) to the end that afterwards she may not take offence; for should you let her see only one or two, she might be brought to be familiar with them, but shy and coy at the approach of a greater number; so that I hold it fit to have at least three Couple, all *Staunch* and well commanded *Dogs*, such as have formerly been bred with *Hawks*; and you must feed your *Hawk* with these *Dogs* about you, and now and then at Feeding times have a dead *Pelt* of some *Hen*, *Pigeon*, or the like, in a short *Creance*; which throw amongst the *Dogs*, to the intent your *Hawk* may stoe from your *Fist*, and chop in amongst them and seize thereon, suffering her to *plume* for some time; then take her to your *Fist* with some *Stump*, and soon after throw out the *Pelt* a second and third time, and continue this practice until she find she may boldly venture on it, and that she perceive the *Dogs* are in more fear of her, than she of them, and it will not be long ere she understands she hath got the Mastery of them.

Should you have Flown your *Hawk* without making her thus familiar, and acquainted with the *Dogs*, 'tis possible, you might have made her go well, and kill well; but could not expect her coming again, if there were but one *Dog* in the *Field*, for next to a Man, she fears nothing so much as a *Dog*; and of all *Hawks*, a *Goshawk* is the most Coy; therefore when you make her to the *Covert* at first entrance, use but few *Dogs*, and and those at good command.

When you have let her go, call in your *Dogs* behind you, until you have found her, which possibly may be on the *Ground*, and with the Prey in her *Feet*; if so, make in unto her, and let her enjoy it in some open smooth place, where she may *Plume* thereon; then call your *Dogs*, and let them ruffle in and out amongst the *Bushes*, that she may be acquainted with the Noise and Motion of them. You may then rend the *Chaps* of the *Fowl*, to give her *Blood* in the *Throat* of the *Prey*, also open the *Brain pan*, and give her the *Head* in her *Feet*, as before directed; and be sure let no strange *Dogs* be amongst them.

If in Case your *Hawk* hath hard Flown a *Pheasant*, yet mist, whereupon the *Dogs* Hunting to retrieve it, find it unable to rise, your best Course is to rebuke away your *Dogs*, to throw up the *Pheasant* a loft, using your *Voice*, and let your *Hawk* truss it; and then call in your *Dogs* as aforesaid.

Spaniels by Nature are very loveing, surpassing all other Creatures, for in *Heat* and *Cold*, *Wet* and *Dry*, *Day* and *Night*, they will not forsake their *Master*. There are many Prodigious Relations, made in several Grave and Credible *Authors*, of the strange Affections which *Dogs* have had, as well to their Dead as living *Masters*; but it is not my Business to take notice of them here, but to apply my self to the Subject in Hand.

The Diseases of Spaniels, and their Cures

Of the Mange.

Spaniels, through too much *Fat* and *Rest*, or too much *Labour* and *Leanesse*, are oft Subject to the *Mange*, especially if they have not Fresh *Water*; Now since you know the Cause, it is not hard to prevent it, but being once infected, lose no time to Cure them, for which use this following Direction. Take one pound of *Lard* of a *Barrow-Hog*, four Ounces of *Flower of Brimstone* well pulverized, two Ounces of *Salt* well beaten, the like quantity of *Ashes* well sifted, three Ounces of common *Oyl*, Boil all these together in a Kettle very well; and with this *Oyntment* anoint the *Dogs Body*, all over before a good *Fire*, two or three times a *Day*, then wash him over with good strong *Lye*, and Shift his *Kenel* often.

There is also a *Bread* to be made, that is very good to Cure the *Mange*; and that is of *Wheaten Bran*, mingled with the *Roots*, *Leaves*, and *Flowers* of *Agrimonie*, beathen or shred very small, and baked; this give the *Dog* to eat, and let him eat no *Meat* without it, nor give him any other *Bread*.

If their *Hair* comes off, as oft it doth, then *Bath* them in the Water of *Lupines*, or *Hops*, and anoint them with *Stale Barrows Lard*.

If these *Medicines* will not do, then use this that is more strong, take two Quarts of strong Whitewine *Vineger*, six Ounces of common *Oyl*, three Ounces of *Brimstone*, six Ounces of *Soot*, and two Handfuls of beaten *Salt*; Boil all these together in the *Vineger*, and *Bath* the *Dog* therewith, as before directed.

Of the Formica, and the Cure.

IN *Summer* time *Dogs* are troubled with sore Ears, occasioned by *Flies*, and their own scraping and scratching them with their *Feet*; For *Cure*, take four Ounces of Gum *Dragaganth*, which infuse in strong *Wine Vineger* for a *Week*, then Bruise it well, and put thereto *Roch Allom* and *Galls* beaten to Powder, of each two Ounces. These *Ingredients* being well mixt, apply to the place grieved.

Of Swelling in their Throat and Neck.

SOmetimes there falleth, or distilleth down a sharp, salt, thin *Rhume* from their *Brain*, by which means their *Throats* and *Necks* do much swell; for *Cure*, anoint the place with *Oyl* of *Camomile*, and wash the *Throat* with weak *Vineger* and *Salt*.

Of

Of Worms Breeding in the Hart, and Mangy places of Dogs.

IF your *Spaniel* receive hurt, if he can but lick the place, it will be whole without any *Medicine*, but if he can't, he must be assisted, by strewing on the place some Powder of *Matresilvat*, dried in an *Oven*, or in the *Sun*.

Sometimes there will engender little *Worms* in the *Wounds*, which doth much retard their Recovery, nay, rather render them worse and worse; To Remedy this Evil, put into the *Wound* a little *Gum* of *Ivy*, and let it continue therein a *Day* or more, then wash the place with *Whitewine*, and so dress it with an *Oyntment* made of *Bacons Grease*, *Oyl* of *Earth-Worms*, and *Rue*.

If they are bit with a *Mad Dog*, let them three or four times eat of the Broth of *Germander*, also eating thereof it self. It must be Sodden with *Salt* and *Oyl*, and so given in little *Pellets*.

If *Worms* be within the *Body*, give them fasting the *Tolk* of an *Egg*, with about two Scruples of *Saffron*, keeping him fasting till the next *Morning*.

All *Spaniels* have a certain *String* under their *Tongues*, by most called a *Worm*; this must be taken out when they are about two *Months* Old, with the help of a sharp *Knife* to slit it, and a *Shomakers Awl* to raise it up. Be careful to take all out, else your pains is to little purpose; for till then he will hardly be ever fat or right, in regard the *Worm*, or *String* will grow Foul and Troublesom, and hinder his *Rest* and *Eating*.

To Recover a Spaniels Smelling.

IT oft falls out, that *Spaniels* through too much *Grease* and *Rest*, do lose their *Smelling*, so that they can't Retrive or Spring their *Game*. In this Case prepare this following *Purge*. Take two *Drams* of *Agarick*, one *Scruple* of *Sal Gemma*, beat them to *Powder*, and mix them with *Oxymel*, and give a *Pill* about the bigness of a small *Nut*; and that it may the better slip down, wrap it up in Fresh *Butter*; for he will hardly take it but by force.

Several things to be observed in Spaniels.

THe best way to breed *Spaniels* is to let their Dams be about two years old, and that they may Litter about *March*; and kill all the *Puppies* but four or five. Your *Dog* should be about six or seven years old. The first *Litter* is to be esteemed the best; yet some prefer the second and third for the best. The Names of your *Spaniels* should be short, and Monosillables, that they may be the better and quicker understood. It is left to your own discretion to have any of the *Dogs* gelt, or the *Bitches* spaid: But if in case you do so, let it be done whilst they are young; for such are not apt to be lost by straging away.

For divers Reasons it is necessary to cut off the top of the *Spaniel's Stern* or *Tail* whilst he is a *Whelp*, for it hinders the breeding of *Worms* there: Also if it is taken off he will be more forward to press into the *Covert* after the *Game*; besides he is more graceful with a short *Stern*, as *Greyhounds* and *Hounds* are with theirs long.

Instead of cutting off the *Stern*, it is better to twist it off, which must be done whilst they are *sucking*: And if thus pulled off, there is a *string* that comes out with it which doth much hinder their *madness*.

Thus much concerning *Land Spaniels*; I shall only add a few *Lines* of Advice, and so end this *Chapter*.

Every *Gentleman*, whose *Genius* leads him to this delightful *Recreation*, should apply and ensure himself as well to look into the ordering and right managing his *Hawk*, as into their *flying*. He should as well observe them in the *House* as in the *Field*: For a *Gentleman* to have but one *Hawk*, is to have as it were none; and to have a great many is to be a *Falconer*, and not a *Gentleman*. He that keeps one, and no more, must be forced to leave all other Affairs to see her flee at such time that she is in a condition to flee, and that peradventure may not be above twice a *Week*, in regard of such Accidents that oft-times intervene. I should therefore advise you to keep a *Cast*; for the same Charge that keeps one will keep two; and five or six couple of *Spaniels* are enough, which should be of a middle size, rather fat than lean, which are better for use, and more creditable: Besides, the lean ones are subject to many *Diseases*.

With this *Equipage* a *Gentleman* may so manage his Pleasure, as to render it rather profitable than chargeable unto him.

CHAP. XXIV.

Certain Terms of Art used in Falconry, with an Explanation thereof, Alphabetically set down.

ARms, are the *Legs* from the *Foot* to the *Thigh*.

Bate, or *Bateth*, is a Term when a *Hawk* flutereth with her *Wings* from the *Perch* or *Fist*, indeavouring to fly away.

Bathing, is when she washeth her self.

Beak, is the upper crooked part of the *Bill*.

The *Beam Feathers*, are the long *Feathers* in the *Wings*.

Beavy, of *Quails*, that is a *Brood* of young ones.

Bewits, are the *Leathers* with *Bells* buttoned about her *Legs*.

Bowet, is when a young *Hawk* draws any thing out of her Nest, and indeavours to get on the *Bows*.

Bowsing, is when she oft *drinks*, and yet desires more.

Brayle, is a piece of *Leather* slit to put upon her *Wing* to tye it up.

Bratcher,

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Brancher is a young *Hawk* newly taken out of the Neſt, and can hop from *bough* to *bough*.

Cage is that on which the *Hawks* are carried, when they are expoſed to ſale.

Cancelluring, that is *ſtooping*.

Carry is a Term when the *Hawk* flees away with the *Quarry*.

A *Caſt* of *Hawks* are two.

Caſting is when you give her any thing to purge or cleanſe her *Gorge*.

Cateract is a *Diſeaſe* in the *Eyes* of a *Hawk*.

Cauterizing Irons are uſed to ſear with.

Cawking time, that is *Treading* or *Coupling time*.

Check is when ſhe forſakes her proper *Game*, and flies at *Crows*, *Pyes*, or the like, that croſſeth her in her flight.

Clap is the neither part of the *Beak*.

Coping is *paring*.

Coping Irons are uſed for *coping* or *paring* her *Beak*, *Pounces*, or *Tallons* when over-grown.

Cowring is when they quiver and ſhake their *Wings* in teſtimony of obedience toward the old ones.

Covey of *Partridges*, that is, a *Brood* that always accompany together with the old ones until paring time.

Crabing is when *Hawks* ſtanding near one another, fight.

Cray is a Diſeaſe in a *Hawk*.

Creance is a long Line of ſmall fine even *Packthread* that is faſtned to the *Hawks Leaſe* when ſhe is firſt *Lured*.

Crivets are the ſmall black *Feathers* like *hairs* about the *Sear* or *Eyelids*.

Crock is a Diſeaſe in a *Hawk*.

Diſcloſed is when the young ones juſt peep through the *Shells*.

Dropping is when ſhe *Mewteth* downwards in ſeveral drops, and not yerking it ſtrait forwards.

Endew is when ſhe digeſteth her *Meat*, not only diſcharging her *Gorge* thereof, but alſo cleanſeth her *Pannel*.

Enguteth, that is, the *Feathers* to have black ſpots.

Enſeame is the purging her of her *Glut* and *Greaſe*.

Enter a Hawk is a Term uſed when ſhe begins firſt to kill.

Eyeſs is a young *Hawk* newly taken out of the *Neſt*.

Eyrie is the place where they build and hatch their young.

Feaking is wiping her *Beak* after feeding.

Filanders is a *Diſeaſe* in a *Hawk* ſo called.

Flags are the *Feathers* next the principal *Feathers* in her *Wings*.

Flyon Head, that is, miſſing her *Quarry*, and betaking her ſelf to the next *Check*, as *Crows*, *Pyes*, &c.

Formale is the Female *Hawk*.

Formica is a *Diſeaſe* ſo called.

Frowwee is a *Diſeaſe* ſo called.

Gleam is a Term u'ed after a *Hawk* hath *Caſt*, and *Gleamiſh*, or throweth up filth from her *Gorge*.

Glut is the ſlimy ſubſtance that lies in the *Pannel*.

Gorge is the *Craw* or *Crop* of other Fowl.

Gurgiping is when ſhe is ſtuff up.

Hack is a place where her *Meat* is put.

Hack Hawk, that is, a *Tackler*.

Haggard is a *Hawk* that has *preyed* for her ſelf, and taken after *Lent*.

Jack is the *Male Hawk*.

Jeſſes are the ſhort ſtraps of *Leather* that are faſtned to her *Legs*, and ſo to the *Leaſe* by the *Varvils*.

Imp is to put in a *Feather* into the *Wing* in the place of one broken.

Jeſſe is the *Neck* from the *Head* to the *Body* of any *Bird* that ſhe preyeth upon.

Inter-Mewing is from the firſt exchange of her *Coat* till ſhe turn white.

Jouketh is when ſhe ſleepeth.

Lean is when ſhe holds in to you.

Leaſe or *Leach* is the ſmall long *Leather thong* faſtned to the *Jeſſes* by which ſhe is held faſt on the *Fiſt*, as being wrapt about the *Fingers*.

Lure is that which the *Falconers* caſt up to bring down the *Hawk*.

A *Make Hawk* or *Quarry Hawk*, is an old *Staunch Hawk* that is made uſe of to enter young ones.

Mailes are the *Breaſt Feathers*.

Manning is making a *Hawk* endure *Company*.

Mantleth is when ſhe ſtreteheth one *Wing* after her *Legs*, and ſo the other.

Mew is the place where ſhe is ſet down during the time ſhe raiſeth her *Feathers*.

Mewting is the *dung* of long winged *Hawks*.

The *Nares* are little holes in her *Beak*.

Pannel is the Pipe next the Fundament where ſhe digeſteth her *Meat* from her *Body*.

Pantas is a *Diſeaſe* ſo called.

Perch is where ſhe is ſet to reſt on.

Pelt is the dead *Body* of any *Fowl* ſhe has killed.

The *Pendant Feathers* are thoſe behind the *Thighs*.

Petty Singles are the *Toes* of the *Hawk*.

Pill or *Peſſ*, is that which ſhe leaveth of her *prey* after ſhe is relieved.

The *Pin* is a *Diſeaſe* ſo called.

Plume is the general mixture of *Colours* and *Feathers*, by which the conſtitution of a *Hawk* is known.

Plumage are the ſmall *Feathers* given the *Hawk* to make her *Caſt*.

Pluming is after ſhe has ſeiz'd her *prey*, and diſmantles it of her *Feathers*.

Pounces are her *Claws*.

Poult, that is, killing *Poultrey*.

Pride, that is, to be in good *fleſh* and *heart*.

Pruneth is when ſhe picketh her ſelf.

Putover is a Term uſed when ſhe removeth her *Meat* from her *Gorge* into her *Bowels*, by traverſing with her *Body*, but chiefly with her *Neck*.

Quarry is the *Fowl* ſhe flyeth at, either dead or alive.

Quarry Hawk is an old entred and *reclaimed Hawk*.

Rake is a Term when ſhe flies out too far from the *Game*.

Ramage or *Soar* is when ſhe can flee, having preyed for her ſelf.

Rangle is when ſhe has *Gravel* given her to bring her to a *Stomach*.

Reclaim is to make her gentle and familiar.

Retrieve is when *Partridges*, having been ſprung, are to find again.

Rouze is when ſhe lifts her ſelf up, and ſhakes her ſelf.

Ruff is when ſhe hits the *prey*, and doth not truſs it.

Rufter-hood is a large, wide, and eaſie *Hood*, open behind, being the firſt that is made uſe of.

Rye is a *Diſeaſe* ſo called.

Sails are the *Wings* of a *Hawk*.

Sear is the *yellow* betwixt the *Beak* and the *Eyes*.

Seeling is when ſhe is firſt taken, is blinded with a *Thread* run through the *Eyelids*, that ſhe ſeeth but little, or not at all, that ſhe may the better indure the *Hood*.

Seizing is when ſhe gripes the *prey* with her *Tallons*.

Setting down is when ſhe is put into the *Mew*.

Slice is when ſhe *Mewteth* a good diſtance from her.

Sliceth is the *dung* of a ſhort winged *Hawk*.

Slimeth is when ſhe *Mewteth* without *droping*.

Staunch Hawk is one well entred for the *Game*.

Stooping is when ſhe is aloft upon the *Wing*, and deſcends to ſtrike the *Game*.

Summed is when ſhe is in all her *Plumes*.

Swivel is that which keepeth a *Hawk* from twiſting.

Taſſel is the *Male Hawk*.

Tiring is when you give her the *Leg* or *Pinion* of a *Pigeon*, or the like, to pluck at.

Towreth is when ſhe lifts up her *Wings*.

Train is the *Tail* of the *Hawk*.

A *Train* is ſomething live or dead tyed to the *Lure*, to intice her to it.

Truſſing is vvhen ſhe raiſeth a *Fowl* aloft, and ſoaring vvith it, at length deſcends vvith it to the Ground.

Vervels are little ſilver *Rings* at the end of *Jeſſes*, on vvhich the Ovvners Name is engraven.

Unreclaimed is vvhen ſhe is vvild.

Unſtrike the Hood is to dravv the *ſtrings*, that it may be in readineſs to pull off.

Unſumed is when the *Feathers* are not fully grown.

Vrives are *Nets* to Catch *Hawks* with

Weathering, is the Airing your *Hawk*.

CHAP. XXV.

An Abſtract of the Statutes relating to Hawking.

Stat. 11. *Hen.* 7. *Chap.* 17. It is enacted, that none ſhall take out of the *Neſt* any *Eggs* of a *Hawk*, or *Swan*, on pain of a *Year* and a *Days Impriſonment*, beſides to incur a *Fine* at the *Kings* pleaſure, to be divided betwixt the *King*, and the owner of the *Ground*, where ſuch *Eggs* are ſo taken.

None ſhall take away any *Hawk* of *Engliſh* Breed called an *Eyeſs*, on pain of the like Forfeiture to the *King*.

He that brings an *Eyeſs* from beyond *Sea*, ſhall bring a Certificate under the *Cuſtomers Seal* where he Lands, or if out of *Scotland*, then under the Seal of the *Lord Warden*, or his *Lieutenant*, to Teſtifie, ſhe is a Foreign *Hawk*, upon pain of forfeiture of the ſaid *Hawk*.

None ſhall take away any *Hawk* from their *Coverts*, where they uſe to Breed, on pain of 10 *l.* to be divided betwixt the *King* and the *Proſecutors*, by the Juſtices of the Peace.

Stat. 34. *Edw.* 3. *Chap.* 22. A *Hawk* that is found, ſhall be delivered to the Sheriff of the County, where it is found; and ſhall make *Proclamation* at the *Market Towns*, that the owner may come to have notice thereof; and if a Poor Man comes to find her, and ſhe be not challenged in four Months, the *Sheriff* ſhall detain her, paying the Party for taking her up. And if any take away or Conceal a *Hawk*, he ſhall anſwer the value to the owner when claimed, and ſuffer two Years Impriſonment; and if he is not able to ſatisfie the value, he ſhall remain in Priſon a longer time.

Stat. 37. *Edw.* 3. *Chap.* 19. He that *Steals* and carries away a *Hawk*, not obſerving the *Ordinance* of 34 *Edw.* 3. *Chap.* 22. as aforeſaid, ſhall be deemed a *Felon*.

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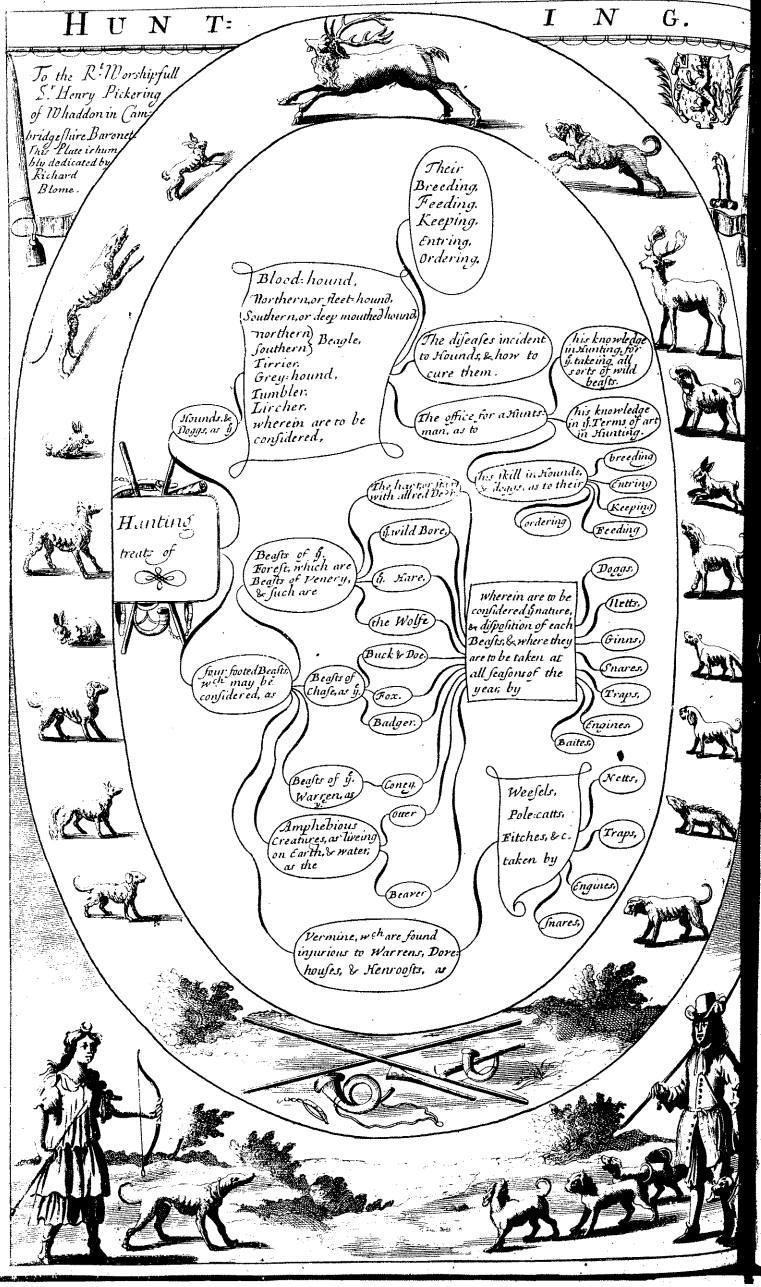
HUNT: ING.
To the R.t Worshipfull S.r Henry Pickering of Whaddon in Cambridgeshire Baronet. This Plate is humbly dedicated by Richard Blome.
Their Breeding. Feeding. Keeping. Entring. Ordering.
Blood-hound. Northern, or fleet-hound. Southern, or deep mouthed hound. northern. southern. Beagle. Tirrier. Grey-hound. Tumbler. Lircher. wherein are to be considered.
The diseases incident to Hounds & how to cure them.
his knowledge in Hunting, for ye taking all sorts of wild beasts.
The office for a Hunter-man, as to
his knowledge in ye Terms of art in Hunting.
Hounds. & Dogge, or ye
Hunting treats of
his skill in Hounds & dogges, as to their
breeding
entring
keeping
ordering
breeding
The hart or stag with all his
ye wild Bore.
ye Hare.
the Wolfe
Beasts of ye Forest, which are Beasts of Venery, & such are
wherein are to be considered ye nature, ye disposition of each Beast, & where they are to be taken at all seasons of the year, by
Dogges
Netts.
Ginns.
Snares.
Traps.
Engines
Baites.
four-footed Beasts which may be considered, as
Beasts of Chase, as ye
Buck & Doe.
Fox.
Badger.
Beasts of ye Warren, as
Conys.
Otter
Amphibious Creatures, as living on Earth & water, as the
Beaver
Weesels. Polecatts. Fitches, &c. taken by
Netts.
Traps.
Engines.
Snares.
Vermine, wch are found injurious to Warrens, Doves houses, & Henroosts, as

HUNTING.

PART III.

Treats of the several Sorts of Hounds; *with Directions to* Breed, Manage *and* Enter *them for the several* Games. *The Disposal of a* Dog-Kennel, *for the most Commodiousness; with Directions to* Feed *and* Order *them. The* Diseases *incident to* Hounds, *with Instructions how to* Cure *them. The several Sorts of* Deer, *with the proper* Terms *and* Ways *used in* Hunting *them; with the Use of the* Blood-Hound. *Of the Hunting the* Fox, Badger, Otter, Wild-Bore, &c. *Of the* Hare, *and how to Hunt or Course her with* Hounds *or* Grey-Hounds, *according to the Season of the Year. How to Take the* Fox, Otter, Badger, Hare, Coney; *as also the* Polecat, Fitchet, &c. *with* Nets, Traps, Snares, Engines, *and the like. Illustrated with variety of* Figures.

CHAP. I.

The Introduction.

MANY have written of this Subject, as well the *Ancient* as the *Modern*, yet but few of our *Countrymen* to any purpose; and had One all the *Authors* on this Subject (as indeed on any other) there would be more trouble to pass by than to retain, most *Books* being fuller of *Words* than *Matter*, and that which is for the most part very erroneous. I shall endeavour to treat of such things as are experimentally found necessary by the most expert *Sports-Men* in this *Age*, and with what brevity is convenient, applying my self to the *Age*, as well as to the *Place* we live in; not troubling the *Reader* with the *Hunting* of the *Ancients*, or of other *Countries* much different from ours; (except of the *Wild-Boar*, which being so Noble a *Chase* in *Germany*, and some other Parts, although we have none amongst us; yet I shall give you a brief Account of the *Hunting* him.)

The Intent therefore of this *Treatise* shall be, to set forth the several ways of taking *Four-footed Beasts*, as well those that are hurtful, as such as serve for our nourishment; and that not only by *Dogs*, but by *Nets*, *Traps*, *Engines*, *Snares*, and the like, not hitherto treated of by any, especially in our Native *Tongue*.

To tell you that *Hunting* is a commendable *Recreation*, and hath always been practised and highly prized by all *Degrees* and *Qualities* of *Men*, even by *Kings* and *Princes*; that it is a great preserver of *Health*, a Manly *Exercise*, and an increaser of *Activity*; that it recreates the *Mind*, strengthens the *Limbs*, and whets the *Stomach*; and that no *Musick* is more charming to the *Ears* of *Man*, than a *Pack* of *Hounds* in full *Cry* is to him that delights in *Hunting*, is to tell you that which experimentally is known, and what hath been sufficiently treated of by others; so that these and the like *Encomiums* I shall here omit, and proceed to that which is more material.

I shall first treat of *Dogs*, so far forth as they are used in this Exercise, laying down *Rules* how to Train them up; to *Breed*, *Nourish*, *Heal*, *Keep* and *Instruct* them, together with many other Particulars: In all which the *Table* of the several

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Chapters at the latter end, may serve for a *Thread* to guide you through the many *Intricacies*, *Windings* and *Turnings*, which are in this *Treatise*; and indeed it can't otherwise be, if the Subject whereon it treats is considered: However, I shall endeavour to lay down every thing for the greatest advantage for your ready apprehension, and yet without circumlocution; a short *Chase* being the most profitable and pleasant.

CHAP. II.

Of DOGS or HOUNDS.

THey who undertake to distinguish *Hounds* by their *Colours*, do but trifle away their time, it being no inherent quality or ingredient towards the making any thing good and useful; but the *Proportions*, *Sizes*, and *Features* are to be enquired after.

Your large, tall and big *Hounds*, called and known by the name of the *Deep-mouthed*, or *Southern-mouthed Hound*, are heavy and slow, and fit for *Woodlands* and *Hilly-Countreys*; they are of *deep Mouths* and swift *Spenders*; they are generally higher behind than before, with thick and short *Legs*, and are generally great of *Body* and *Head*, and are most proper for such as delight to follow them on Foot, as *Stop-Hunting*, as some call it; but by most it is termed *Hunting under the Pole*; that is, they are brought to that exactness of Command, that in their hottest *Scent* and fullest *Chase*, if one but step before them or hollow, or but hold up or throw before them the *Hunting-Pole*, they will stop at an instant, and Hunt in *Full Cry* after you at your own pace, until you give them encouragement by the Word of Command, which much adds to the length of the Sport, and pleasure of the *Hunters*, so that a *Course* oft times lasts five or six hours.

Opposite to the *Deep-mouthed* or *Southern-Hound*, are the long and slender *Hounds*, called the *Fleet* or *Northern-Hound*, which are very swift, as not being of so heavy a Body, nor hath such large *Ears*: These will exercise your *Horses* and try their strength; they are proper for open, level and Champain *Countreys*, where they may run in view and full Speed; for they *Hunt* more by the *Eye* than the *Nose*, and will run down the *Game* in an hour, and sometimes in less; that is, a *Hare*; but the *Fox* will exercise them better and longer.

Between these two Extreams, there are a middle sort of *Dogs* which partakes of both their qualities, as to strength and swiftness, in a reasonable proportion; they are generally bred by crossing the *Strains*, and are excellent in such *Countreys* as are mixt; *viz.* Some *Mountains*, some *Enclosures*, some *Plains*, and some *Wood-lands*; for they will through thick and thin, neither need you help them over *Hedges*, as you are often forced to do by others.

A true right shaped *Deep-mouthed Hound* should have a round thick *Head*, wide *Nostrils*, open and rising upwards, his *Ears* large and thin, hanging lower than his *Chaps*; the *flews* of his Upper *Lips* should be longer than those of his Neither *Chaps*; the *Chine* of his *Back* great and thick, strait and strong; and rather bending out than inclining in; his *Thighs* well trussed; his *Haunches* large; his *Fillets* round and large; his *Tail* or *Stern* strong set on, waxing Taperwise towards the top; his *Hair* under his *Belly* rough and long; his *Legs* large and lean; his *Feet* dry and hard, with strong *Claws* and high *Knuckles*. In the whole, he ought to be of so just a Symetry, that when he stands level you may not discern which is higher, his Fore or Hinder parts.

For the *Northern* or *Fleet-Hound*, his *Head* and *Nose* ought to be slenderer and longer, his *Back* broad, his *Belly* gaunt, his *Joynts* long, and his *Ears* thicker and shorter: in a word, he is in all parts slighter made, and framed after the Mould of a *Greyhound*.

By crossing these *Breeds*, as aforsaid, you may bring your *Kennel* to such a composure as you think fit, every Mans fancy being to be preferred; and you know the Old saying,

So many Men, so many Minds;
So many Hounds, so many Kinds.

The *Blood-Hound* is of all *Colours*; but for the generality of a *black Brown*, and *Reddish* in several places, especially on the *Breast* and on the *Cheeks*; they have long and thin hanging-down *Ears*, and differ from other *Dogs* only in their *Cry* and *Barking*. Being set on by the Voice or Words of their *Keeper*, to seek about for *Game*; and having found it, will never leave off the pursuit until it be tyred; nor will he change it for any other fresh *Game* that he should meet with; and they are observed to be very obedient to their *Masters*.

These *Hounds* are of that property, that they do not only keep to their *Game* whilst living, but being by any accident wounded or dead, will find it out; and that by the Scent of the *Blood* sprinkled here and there upon the *Ground*, which was shed in its pursuit, by which means *Deer-Stealers* are oft-times found out.

Not much unlike these *Blood-Hounds*, is the *Sluth* or *Suit Hound* in *Scotland*, which Hunts only by the *scent* of the *Footing*; and these sort of *Hounds* are made use of for the finding out *Thieves*, being of a very quick Scent, and eager in their pursuit, no *River* obstructing them. And these sorts make the best and surest *Blood Hounds*.

BEAGLES.

THere are several sorts of *Beagles*; *viz.* the *Southern-Beagle*, which is something less than the *Deep-mouthed Hund*, and something thicker and shorter.

The *Fleet*, *Northern* or *Cat-Beagle* is smaller, of a finer shape than the *Southern-Beagle*, and are hard Runners.

Those

These two *Beagles* by crossing the *Strains*, breeds an excellent sort, which are great Killers.

There is also a very small sort of *Beagle*, not exceeding the bigness of a *Ladies Lap-Dog*, which makes pretty diversion for the *Coney*, as also for the *Hare*, if the Weather be dry; but the smallness of these makes them not serviceable.

The TERRIER or HARRIER.

THis is a very small *Dog*, and used for the Hunting the *Fox* or *Badger*, his business being to go into their *Earths*, and to *Bay* them; that is, to keep them in an *Angle* (a *Foxes Earth* having divers) whilst they are dug out; for by their *Baying* or *Barking* 'tis known whereabouts the *Fox* is, that he may be the better dug out. And for this use the *Terrier* is very serviceable, being of an admirable Scent to find him out.

They commonly have a Couple of *Terriers*, to the end that they may put in a fresh one to relieve the first.

A *Dog* bred out of a *Beagle*, and a *Mungril-Mastiff* generally proves a good *Terrier*, having a thick Skin and a good Courage, as partaking of the *Mastiff*, and is well Mouthed from the *Beagle*.

The TUMBLER and LIRCHER.

THe *Tumbler* is a small sized *Dog*, generally White, with some black Spots, hath one *Eye* bigger than the other, and is a well trust *Dog*. He is a Creature of great craft and subtilty; for in the *Hunting* his *Game*, which is the *Coney*, he useth great Policy; being called *Tumblers* from their nature and quality of *Tumbling*, and winding themselves in Hunting and Taking their *Game*.

When this *Dog* is sent or cast off into a *Warren* by his *Master*, who hath fixed his Station in some convenient and private place, which the *Dog* must be privy to; he seemingly *Hunts* not after them, but as it were not regarding them, observing their *Burrows*; and when he meeteth with a place where there are *Coneys*, he coucheth down close with his *Belly* to the ground, and so ordereth his business that the Wind is against him, and that the *Coneys* do not discover him, by which means he gets the Scent of them, and gets betwixt them and their *Burrows*, and so they soon become his Prey; and so soon as caught, being so well educated that he carrieth it to his *Master*, and returneth again to his business, as aforesaid; and using such like Subtilties, in a short time will catch a sufficient quantity, provided there be *Game*.

The *Lircher* is a sort of *Dog* much like a *Mungril Greyhound*, with prick *Ears*, hath generally a shagged Coat, and is of a yellowish white Colour. They are very Nimble Runners, for if they get but betwixt the *Burrows* and the *Coneys*, they seldom miss; and this is their usual way of *Hunting*, yet they use some other Subtilties as the *Tumbler*; some of these *Dogs* will bring their *Game* as the *Tumblers*, and those are the best. The *Lircher* will Run down the *Hare* at Stretch.

The GREYHOUND.

THis Sort of *Dog* of all others, is for swiftness of *Foot* and Neatness of Shape to be preferred before all others. But there being a Chapter relating only to *Greyhounds*, I shall not say more of him here, referring you to the said Chapter, where he is Treated of, with Rules for Coursing with him.

Thus having given you a Brief Account of the several sorts of *Hounds*, and *Dogs* used in *Hunting*, I shall add a word or two to tell you, that *Lancashire* with other *Woodland* and *Mountainous Countries* Breed the Large, tall and heavy *Hounds*; that *Bedfordshire*, and many other Countries that have a well mixt *Soil*, both of *Champain* and *Covert* Breed a Middle-Sized *Hound*, and of a more nimble Foot; and that the *Northern* parts Breed the *Fleet*, and Slender *Hound*.

The next thing to be be Treated of, shall be the *Breeding* of *Hounds*, the *Disposal* of the *Kennel*, with *Rules* for *Feeding* and *Entring* them

CHAP. III.

Of Breeding of Hounds, the disposal of the Kennel, with Directions for the Feeding and Entring Hounds, and how they ought to be Ordered.

THose that would have Fair *Hounds*, must choose Fair *Bitches*, and such as are strong, and well proportioned in all Parts, with great and large *Ribs* and *Flanks*.

The best Season to let your *Hounds* Couple in, is in *January*, *February*, and *March*, for then they will *Litter* in a good time of the Year, (that is, in the *Spring*) so that they will be fit to enter in due Course, without loss of time, or loss of the Season; for if they *Litter* in the *Winter*, it is very Troublesom to bring up their *Whelps*, and not without a great deal of Difficulty to preserve them from dying, especially of *Diseases*; for the Cold is a great Enemy to all young *Creatures*. Let not your *Dogs* exceed the Age of five Years, for if they are old (according to the Opinion of many) the *Whelps* that they get, will prove dull and heavy. And you should be very careful to get good *Dogs*, for your *Bitches* at their first growing Proud; for some have observed, that if it be a *Mastiff*, *Greyhound*, or *Hound* that first *Lineth* her, in all her *Litters*, that she shall afterwards have, she is said to have one of her Whelps to Resemble the

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the *Dog*, that firſt *Lined* her. And although the firſt *Litter* of *Whelps* is not of ſo much eſteem, as the ſecond or third, as being more weak and ſmall, yet be ſure to have a good fair *Hound* to *Line* her at firſt.

When a *Bitch* is Proud, 'tis not good to cool her in the *Water*, for that doth congeal the *Blood* within her *Veins* and *Arteries*, and cauſe *Mangineſs*, alſo *Gripes* in the *Belly*, with other *Diſeaſes*.

When your *Bitches* begin to be pretty big with *Whelp*, let them not *Hunt*, or uſe violent *Exerciſe*, whereby to occaſion the caſting her *Whelps*, but Feed them well, preparing clean and private places for them, and keep them therein for a few days, to the end they may be accuſtomed thereunto.

Your *Bitches* having *Littered*, 'tis good to chooſe thoſe that you intend to keep, and to drown the reſt; and in making choiſe of the beſt, there is ſome difficulty; ſome are of Opinion, that thoſe that are lighteſt whilſt they ſuck, will prove the Swifteſt and Beſt, but not the Strongeſt; others ſay that the *Whelp* that ſeeth laſt, is the beſt; and others are of Opinion, that to remove the *Whelps*, and lay them in ſeveral places, and watch the *Bitch*, and that which ſhe carrieth to her *Kennel* firſt, is the beſt.

Be ſure to give good freſh *Straw* to them, which muſt be often changed; let them not lye in the *Sunſhine*, or where *Rain* may wet them, and 'tis good to anoint their *Skins* once or twice a *Week* with *Nut-Oyl* mixt with *ſaffron* beaten, which will kill all ſorts of *Worms*, and keep them from the biting of *Flies*. When the *Whelps* are about fifteen days Old, Worm them, and about a *Week* after, cut or wind off one joynt of their *Sterns*, when they can *ſee* give them *Milk* to lap; and about two *Months* Old, 'tis time to Wean them, keeping them from their *Dam*; and 'tis good to keep them well, but not too high Fed; and to prevent Wind in their *Bellies*, put *Cumminſeed* now and then in their Bread.

If you would have your *Bitches* grow Proud, take half a *Caſtors Stone*, two Heads of *Garlick*, the Juice of *Creſſes*, and a little *Cantharadice*, boil theſe together with *Mutton* in *Water*, and the *Broth* made thereof being given twice or thrice, will work the effect, the like it will do being given *Dogs*, to make them deſirous of *Bitches*.

If you would ſpay a *Bitch*, 'tis good to do it after ſhe hath had *Whelps*, or when ſhe is Proud, but not before; and in ſpaying her, be ſure take not away all the Strings or Roots of the *Veins*, for that will much prejudice her as to her ſtrength and ſwiftneſs.

Of the Diſpoſal of a Kennel, and how it ought to be ſituated for the conveniency of the Hounds, with Directions how to feed and order them.

TO the making a compleat *Kennel*, theſe three Conveniencies ought to be conſidered, *viz.* ſweet *Air*, freſh *Water*, and the Morning *Sun*. I ſhall lay down ſome *Rules* for your Inſtruction therein: Your *Court* ſhould be large, for the more ſpacious it is, the better it will be for the *Hounds* to refreſh them in; and it ſhould be well walled or fenced about to prevent their getting out, but not ſo high to keep out the *Sun* or *Wind*. The *Water*, if poſſible, ſhould run through ſome part of the *Court* or *Yard*; or for want thereof a *Well* with a large *Stone Trough* about a Foot and a half high, always kept with freſh *Water*, to the end your *Hounds* may drink when they pleaſe: And at one end of the *Trough* there muſt be a hole to let out the *Water* for the cleanſing it. In the higheſt part of the *Court* let the *Kennel* be built, in which ſhould be two *Rooms*, one of which ſhould be larger than the other, with a large *Chimney* to make a *fire* when need requires: This *Room* ſhould be raiſed about three Foot from the Ground, and in the *Floor* ſhould be two *Gutters* for the conveyance of the *Piſs*: There muſt be diſperſed up and down ſmall *Bed-ſteads* raiſed about a Foot from the *Floor*, with holes pierced through the *Planks* for the drayning away their *Piſs*. The other *Room* muſt be for the *Huntſman* to keep his *Poles, Whips, Liams, Salves*, and the like neceſſaries. There ſhould alſo be a *Copper* for the *boyling*, *dreſſing*, and *ordering* of their *Food* when they come home wet and weary; for at ſuch times they ſhould be cheriſh't as Inſtruments of your *Recreation*, that they may delight in your Service, and taſte of your Bounty, and then doubt not but to have credit of them in the *Field*.

Be careful not to give them any thing to *drink* in Veſſels of *Copper*: And as to the proportion and quality of your Allowance for *food*, it muſt be ordered with relation to the Natures of the *Hounds*, and their ſizes. Three Buſhels of *Oats*, with a Buſhel and a half of *wheat Bran*, will keep ten Couple of middle ſized *Hounds* a Week, giving them ſometimes *Beef-broth*, *Whey*, *Flit-milk*, *Chippings* of *Bread*, *Bones*, and ſometimes a little *Horſfleſh*, for change of Food creates a good Appetite, and cauſeth health. The *Oats* and *Wheat-bran* muſt be boyled and thickned with *Milk* or *Butter-milk*, with ſome *Chippings* or broken *Meat* boyled therein.

As concerning *Horſfleſh*, I approve thereof, provided it be given with diſcretion; and of all ſorts *Horſfleſh* is the beſt and hotteſt, but be ſure to flea or skin them, leſt your *Dogs* diſcerning the *Hair* may fall on them when living in the *Field*. Such *Dogs* that are accuſtomed to Hunt the *Hare*, 'tis not good to give them any Fleſh, becauſe it is ſaid to withdraw their *Scents* or *Affections* from the *Chaſe*, by reaſon their *Fleſh* is not very ſweet, nor their *Scents* very ſtrong.

If your *Huntſman* perceives that through toyl-ſome, long, and frequent *Chaſes*, the *Hounds* fall away, he muſt be the more careful in feeding and cheriſhing them up with ſome good *Broth*, boyled *Oxes* or *Sheeps hearts*, &c.

On ſuch days as your *Hounds* do not *Hunt*, the beſt times to feed them are early in the *Morning* before Sun-riſe, and late in the *Evening* after Sunſet: And on the days they *hunt* they ought to be Rewarded ſo ſoon as they come home, be it when it will, eſpecially at Night with a good Supper; for

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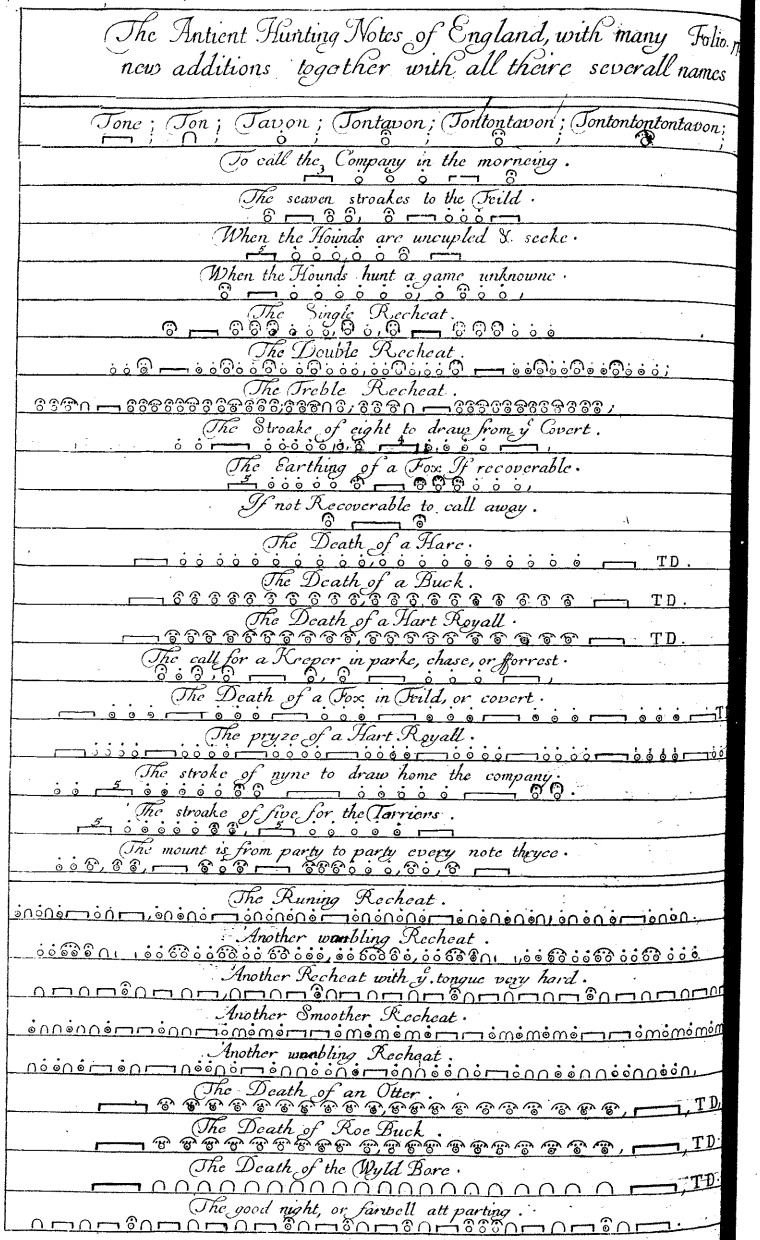
The Antient Hunting Notes of England, with many new additions together with all theire severall names


Tone ; Ton ; Tavon ; Tontavon; Tontontavon; Tontontontavon;
To call the Company in the morneing .
The seaven stroakes to the Feild .
When the Hounds are uncupled & seeke .
When the Hounds hunt a game unknowne .
The Single Recheat .
The Double Recheat .
The Treble Recheat .
The Stroake of eight to draw from ye Covert .
The Earthing of a Fox if recoverable .
If not Recoverable to call away .
The Death of a Hare .
TD .
The Death of a Buck .
TD .
The Death of a Hart Royall .
TD .
The call for a Keeper in parke, chase, or forrest .
The Death of a Fox in Feild, or covert .
The pryze of a Hart Royall .
The stroke of nyne to draw home the company .
The stroake of five for the Tarriers .
The mount is from party to party every note theyce .
The Runing Recheat .
Another warbling Recheat .
Another Recheat with ye tongue very hard .
Another Smoother Recheat .
Another warbling Recheat .
The Death of an Otter .
TD.
The Death of Roe Buck .
TD:
The Death of the Wyld Bore .
TD:
The good night, or farwell att parting .

for nothing is a greater discouragement to a *Hound*, than to go to *sleep* with an empty *Belly* after hard labour.

If your *Huntsman* hath more dead Flesh than he hath present occasion for, he may preserve it sweet a Week or ten days, by sinking it under Ground.

As concerning the entring your *Hounds*, it is not enough to have them well-bred, with promising *Marks* and handsome *Proportions*; but they are to be well instructed how to *hunt*.

When your *Whelps* are about Seventeen or Eighteen *Months* old, teach them to take the Water and swim: Also lead them abroad in the *Fields* in the heat of the day, the better to endure exercise: Also lead them through *Flocks* of *Sheep* and *Warrens*, to bring them to command. They must be also brought to know the *Huntsman's voice*, their *Names*, to understand the *Horn*, and to use their own voices.

HUNTERS Notes.

For your better assistance I have inserted the several *Sounds* that you are to *Wind* upon occasion, which are acccording to the *Plate* here annexed.

Rules for the Entring your Hounds.

Now for the very day and time of Entring your *Hounds*, let it be about *Noon* in a fair warm Day; for if you enter them in the *Morning*, when the Heat comes on, they will give out; and take the most advantage you can that your *Game* may not long stand before them, but that your *Hounds* may be *Rewarded*: And thus must you do at least once a *Week* for about two *Months*, by which means they will be so fleshed and seasoned with that *Game* at which you first enter them, that they will not leave off the pursuit. You must also be sure to enter them with the best and staunched *Hounds* you can procure, and let there not be so much as one *barking Curr* in the *Field*.

The *Hare* is esteemed the best *Game* to Enter young *Hounds* at; for whatsoever *Chase* you design them for, they will thereby learn all *Turns* and *Doubles*, and how to come to the *Hollow*: They will also come to have a perfect *Scent* and hard *Feet*, by being used to *High-ways*, *beaten Paths*, and dry *Hills*. At first give them all the advantages that may be; and when you start the *Hare* from her *Forme*, let the *Scent* cool a little, observing which way she takes; and then lay on your *Hounds* with the most advantage and help you can, either of *Wind*, *View*, *Hollow*, or the *Pricking* in her Passage: Nor were it amiss if they had the advantage of a *Hare* that had been tyred the same Morning by a Course. You must also take care that they *hunt* fair and even, without lagging behind, straggling on either hand, and running wildly on head; and in case you find any committing these Faults, they must be beaten into the rest of the *Pack*, and forced to take the *Scent* with the rest: The like must be done if they refuse to strike upon a Default, but run on babling and yelping without the *Scent*, whereby they draw away the rest of the *Dogs*, until some of the eldest *Dogs* take it; then cherish them with *Horn* and *Hollow*.

In case any of your young *Whelps*, who trusting more to their own *Scents* than to the rest of the *Pack*, and consequently are cast behind, working out the Defaults by their own *Noses*, and that they *Hunt* just and true; in such cases give them all manner of encouragement and assistance, and let them work it out of themselves at their own pace; for such *Dogs* can never prove ill, if not spoiled by your own hastiness and indiscretion: For a little of your Patience and their Experience, will bring them to be your chief *Leaders*.

When you have killed the *Hare*, permit not the *Dogs* to break her up, but beat them off; then *Skin* her and cut her in pieces, and *Reward* your young *Hounds* therewith; and by this means in a short time you will find a great improvement in your *Whelps*.

Some are of Opinion, that the best way to Enter young *Hounds*, is to take a live *Hare*, and *Trail* her after you upon the *Earth*, now one way and then another; and having drawn it a convenient distance off, hide it, and the *Dog* taking the Wind thereof, runneth to and fro until he finds it.

The *Huntsman* must well understand the nature and disposition of his *Hounds* in the finding out the *Game*; for some are of that nature, that when they have found the *Foot-steps*, do go forwards without any *Voice*, or shew of *Tail*; likewise others when they have found Head will shew the *Game*; some again having found the Footings of the *Beast*, will prick up their *Ears* a little, and either *Bark*, or wag their *Stern* or *Ears*; others there are that can't keep the *Scent*, but wander up and down and *hunt Counter*, taking up any false *Scent*; and others there are that can't *Hunt* by the *Foot*, but only by the sight of their *Game*.

For the Entring your *Hound* at the *Hart* or *Buck*, let him be in *Prime* of *Grease*, for then he can't stand up, or hold out the *Chase* so long. The Forrest which you choose should have all the *Relays* of equal proportion, as near as may be; then place your young *Hounds*, with five or six old *Staunch* ones to enter them, and lead them to the furthest or last *Relay*, and cause the *Hart* or *Buck* to be *hunted* unto them; being come up, uncouple your old *Hounds*, and having found the *Hart*, being well entred in Cry, uncouple your Young Ones, and if you find any of them lag behind, whip or beat them forwards. But for your more ready Entring them, take these few Instructions. You may bring them to *Quarry* by taking five or six nimble *Huntsmen*, and each to have two Couple of your *Dogs*, to lead in *Liams*; and having unlodged the *Hart*, pursue him fair and softly without tyring your *Hounds*; and after two or three hours Chase, and that you find him begin to sink, then cast off your Young Ones.

Another way is, by taking a *Buck* or *Stag* in a *Toil* or *Net*, and having disabled him by cutting one of his *Feet*, let him go; then about half an

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hour after, gather your young *Hounds* together, and having found out the *View* or *Slot* of the *Buck* or *Hart* by your *Blood-Hound*, uncouple your young *Dogs*, and let them *Hunt*; and when they have killed their *Game*, let them be *Rewarded* therewith whilſt it is hot; the moſt uſual part being the *Neck* flayed.

Some Enter their young *Hounds* within a *Toyl*, but that is not ſo good; for the *Hart* or *Buck* doth then nothing but turn and caſt about, becauſe he can't run an end, by which means they are always in ſight of him: ſo that if afterwards they were to run at force, a free *Chaſe* being out of ſight, your *Dogs* will ſoon give over.

How the Huntſman ought to Dreſs, Govern and Attend his Hounds.

A Good *Huntſman* ought to be loving to his *Hounds*, eſpecially after hard labour. His firſt buſineſs every *Morning* ſhould be, to cauſe their *Kennels* to be cleanſed; then he ſhould take his *Horn* and Sound three or four times the *Call*, to encourage them and call them to him; and being all about him, let them be Coupled, putting ſuch together, that as near as you can will not fight with one another; and let the young *Dogs* be Coupled with the old *Bitches*, to teach them to follow. Then the *Keeper* muſt be provided with ſome *Bones* or *Fragments* of Meat to carry with him in a *Wallet*, and ſo cauſe the *Hounds* to follow him through *green Corn-Fields*, *Meadows*, and the like places, as well to *Air* them, as to make them know his *Voice*, and train them up for Service; and if any *Dog* doth happen to run at a *Sheep*, or other Tame *Beaſt*, correct him well, that he may be afraid to commit the like Offence another time. And having thus ſpent good part of the *Fore-Noon*, go into ſome *Meadow*, and calling them about you, *Reward* them with ſome of the *Bones* out of the *Wallet*, uſing encouraging words; then let ſome of the Company (being at a diſtance) call them to him by *hollowing* and *winding* his *Horn*; and being about him, let them be *Rewarded* with the reſt; then Couple them, and ſo lead them home to their *Kennel*.

Sometimes it happens, that young *Whelps* will not take the Water; To help this, chooſe a hot Day, and about *Noon* Couple up your *Hounds*, and lead them to the *River-ſide*, and ſo cauſe them to Swim, gently putting them in the Water; and by three or four times ſo doing they will not fear the *Water*.

CHAP. IV.

The Common Diſeaſes incident to Hounds, *with Directions for their Cure.*

BEfore I ſhall enter upon the *Diſeaſes*, it will be neceſſary to teach you how to prevent them, ſeeing that thereby you may ſave your *Purſe*, *Labour*, and *Credit*, and keep up your Pack of *Dogs* for Service. Therefore when you *Hunt*, Feed better than when they Reſt, and let them be neither too Fat nor too Lean, but in an indifferent State; but of the two rather Fat than Lean, by which means they will preſerve themſelves from the *Mange*, *Scabs*, *Madneſs*, and the like, unto which they will be addicted: Which *Diſeaſes* they will be ſubject unto, if they want *Air*, *Water*, or *Exerciſe*. And if you have but the knack to keep them thus in an even temper, they may live long and continue ſound. As for their *Water*, they ſhould be their own Carvers, as before noted, and as to *Exerciſe* and *Dyet*, order it according to diſcretion, obſerving a Medium.

If notwithſtanding theſe Directions you find them troubled with the *Itch*, take ſome *Quickſilver*, and beat it in *Nerve-Oyl* until it be killed, and that the Compoſition become thick like a *Salve*, and of a pale *yellow*; with this anoint the affected place before the *Fire*, rubbing and chafing it well in.

Of the Mange, Tetters, Ring-Worms, and Scabs in Dogs.

THere's ſaid to be four ſorts of *Mange*; *viz.* The *Red Mange*, which cauſeth the *Dogs Legs* to ſwell; the *Skaly Mange*, which grows in Patches as broad as a mans Hand, and takes away the *Skin* where it comes; the *Common Mange*; and the *Black Mange*, which lieth unde the *Skin*, and cauſeth the *Hair* to ſhed. Of theſe *Manges*, the *Red Mange* is the worſt, and hardeſt to be cured.

This *Diſeaſe* is occaſioned by a *Dogs* foundring or over-heating in the Winter, and by taking cold in Swiming over *Rivers* when hot; alſo by lying in cold and moiſt places before he is well dryed.

For Cure, give him a *Purge* thus made; Take an Ounce and an half of *Caſſia-Fiſtularis*, well cleanſed, two Drachms and an half of *Staveſacre* in Powder, the like quantity of *Scamony* prepared in *Whitewine-Vineger*, and four Ounces of Oyl of *Olives*; temper all theſe together, and warm them a little over the Fire, and give it your *Dog* towards night, not ſuffering him to eat any thing till the next Morning; then let him Blood upon a *Vein* that is between the *Hough-ſtring* and the *Bone* of the *Leg*, and within two days after Anoint him with this following *Oyntment*.

Take

Take three Pound of *Nut-Oyl*, one Pound and an half of *Oyl* of *Cade*, two Pound of *Oyl* of *Worms*, three Pound of *Honey*, and one Pound and an half of *Vineger*; boyl all theſe together until half conſumed; then put to it *Rozin*, and *Pitch* or *Tar*, of each two Pound and an half, and half a Pound of new *Wax* unwrought, melt them together; and then put thereto one Pound and an half of *Brimſtone*, two Pound of *Copporas* well tryed, and twelve Ounces of *Verdigreaſe*; ſtir theſe until cold.

This *Medicine* will kill and heal all manner of *Mange* and *Itch*, be it never ſo ſtrong; but before you Anoint your *Dog* therewith, vvaſh and rub him vvith *Water* and *Salt* to cleanſe his *Skin*; then bring him to a good *Fire*, and tye him there that he may *Sweat*. Let his Dyet be vvarm *Broth*, in vvhich put ſome *Brimſtone* to vvarm him within; and this method being taken for about a Week, vvill cure him.

The *Common Mange* oft-times is occaſioned by reaſon of the *Dogs* wanting *fair Water* to drink; as alſo for not keeping their *Kennels* clean.

This *Mange* is eaſily cured by a Decoction made of theſe *Herbs* following; Take two handfuls of *wild Creſſeys*, as much of *Elicampane*, of the Leaves or Roots of *wild Sorrel*, and the Roots of *Frodyls* two Pound; put all theſe into *Vineger* and *Lye*, and let them boyl vvell; then having ſtrained the Decoction, put therein two Pound of *Gray Sope*, vvhich being diſſolved and luke-warm, bathe the *Dog* therewith in the infected places, and in about a *Week* he vvill be recovered.

For Cure of this Diſtemper you may alſo uſe this *Medicine*; Take two Ounces of the ſtrongeſt *Gunpowder*, and mix it vvith very ſtrong *Whitewine-Vineger* until it become like a thick *Salve*, and vvith it anoint the places infected until it bleed, and 'tis a certain Cure.

Some vvill caſt their *Dogs* into a *Tan-Pit*, but that is not ſo good, as endangering their *Eye-ſight*.

To kill Fleas, Lice, Ticks, and ſuch like Vermin, that Dogs are ſubject unto.

THeſe *Vermin* are engendred through vvant of clean *Lodging*, good *Keeping* and *Airing*. For their *Cure*, take about five handfuls of *Rue* chopt ſmall, and boyl it in a Gallon of *Water* until half be conſumed, and ſtrain it through a Cloth; then put to your Water two Ounces of *Staveſacre* in Powder, and being Blood-vvarm bathe your *Dog* therewith. But if you uſe all the Art you can, and remove not the Cauſes, they vvill ſtill be *diſeaſed*; therefore to prevent this, and many other *Maladies* that perplex your *Hounds*, 'tis good to have always in readineſs this following *Oyntment*; Take three Pound of *Wax*, and as much common *Honey*, of Oyl of *Cedar*, *Vineger*, *Roſin*, *Pitch*, and *Brimſtone*, of each one Pound and an half, of *Hogs-Greaſe* and *Copporas*, of each two Pound, of *Verdigreaſe* twelve Ounces, and of new *Wax* half a Pound. Make all theſe into an *Oyntment*; but before you anoint your *Dogs*, vvaſh them in Water boyled vvith *Salt*.

Of Madneſs.

THis Diſtemper is very common amongſt all ſorts of *Dogs*; It is eaſy to prevent, but hard to Cure. There are ſeven ſorts of *Madneſs*, amongſt which ſome are eſteemed incurable. I ſhall Treat of each ſort; but firſt 'twill be neceſſary to ſhew how it comes, and what are its firſt Symptoms.

The firſt Cauſe proceeds from *High Feeding*, want of *Exerciſe*, fulneſs of *Blood*, and *Coſtiveneſs*; for the two firſt, ſomething hath already been ſaid; and for the latter give them once a week, eſpecially in the heat of the Year, five or ſix Spoonfuls of *Sallet Oyl*, which will cleanſe them. If you give them at other times the quantity of a *Hazel Nut* of *Mithridate*, 'tis an excellent thing to prevent *Diſeaſes*, and 'tis very good to Bleed them under the *Tongues*, and behind the *Ears*. But if this *Diſeaſe* have ſeized them before you perceived it, you muſt ſpeedily remove them from the reſt, for fear of an Infection, and go to work with the reſt.

The Symptoms of this *Diſeaſe* are many, and eaſily diſcerned. When you ſee any *Dog*, ſeparate himſelf contrary to his former uſe, to become *Malancholy*, or *Droop* with his *Head*, to forbear *Eating*, and as he runs to ſnatch and away at every thing he meets with, if he often looks upward, and that his *Stern* at the ſetting on be a little erect, and the reſt hanging down, if his *Eyes* be red, his Breath ſtrong, his *Voice* Hoarſe, and that he driveleth and foameth at the Mouth, you may aſſure your ſelf he hath this Diſtemper.

The ſeven ſorts of *Madneſs* are as followeth; of which the two firſt that I ſhall Name are incurable, *viz.*

Hot Burning Madneſs, and *Runing Madneſs*; theſe two are very Dangerous, for all things they bite and draw Blood from, will have the ſame Diſtemper, they generally ſeize on all they meet with, but chiefly on *Dogs*; their pain is ſo great, that it ſoon kills them. The five curable *Madneſſes* are,

Sleeping Madneſs, ſo called from the *Dogs* great Drowſineſs, and almoſt continual *Sleeping*; and this is cauſed by little *Worms* that breed in the Mouth of the Stomach, from Corrupt Humours, *Vapours* and *Fumes* which aſcend from the *Head*; for Cure take five Ounces of the Juice of *Wormwood*, two Ounces of the Powder of *Hartshorn* burnt, and two *Drams* of *Agaric*, mix all theſe together with a little *Whitewine*, and give it the *Dog* to Drink in a *Drenching-horn*.

Dum Madneſs lyeth alſo in the *Blood*, and cauſeth the *Dog* not to Feed, but to hold his *Mouth* always wide open, frequently putting his *Feet* to his *Mouth*, as if he had a *Bone* in his *Throat*. For *Cure* take the Juice of black *Hellebore*, the Juice of *Spathula putrida*, and the Juice of *Rue*, of each four Ounces; and having well ſtrained them, put thereto two Drams of unprepared *Scamony*, and being well mixt together, put it down the *Dogs Throat*, in a *Drenchinghorn*, keeping his Head up for ſome time, leſt he caſt it out

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out again; then Bleed him in the Mouth, by cutting two or three of the Veins in his *Gumbs*.

It is said that about eight *Drams* of the Juice of an Herb called *Hartshorn*, or *Dogtooth*, being given the *Dog*, cureth all sorts of *Madness* curable, but whether so or not, I leave to tryal.

Lank Madness is so called, by reason of their leanness and pining away; for *Cure* give them a *Purge*, as before directed, and also Bleed them.

Rhumatick or *Slavering Madness*, doth occasion his *Head* to swell, his *Eyes* to look yellow, and always slavering, or drivilling at his *Mouth*. For *Cure* take four Ounces of the Powder of the Roots of *Polipodie* of the *Oak*, six Ounces of the Juice of *Fennel Roots*, with the like quantity of the Roots of *Misletoe*, and four Ounces of the Juice of *Ivy*, boil all these in *Whitewine*, and give it your *Dog* in a *Drenching-horn*, as hot as he can take it.

Falling Madness is so called, because it lieth in their *Heads*, making them Reel as they go, and to fall down. For *Cure* take four Ounces of the Juice of *Briony*, and the like quantity of the Juice of *Piony*, with four Drams of *Stavesaker* pulverized, mix these together, and give it your *Dog* in a *Drenching-horn*; also let him *Bleed* in the *Ears*, and in the two *Veins* that come down his *Shoulders*, and indeed Bleeding must be used for all sorts of *Madness*.

To prevent Dogs from being mad, that are Bitten of mad Dogs, by Bathing them.

Fill a *Barrel* or *Bucking-Tub* full of Water, and put therein about a Bushel and a half of *Salt*, which stir well, that it may be dissolved; then put in the *Dog* that is Bitten, and plunge him over *Head* and *Ears* seven or eight times therein; and it will prevent his being *Mad*, but he should be also *Blooded*

Gauls, Tetters, Ringworms, Cankers and Dry Sores, with Directions to kill them.

For these Distempers, the aforesaid *Oyntment* is excellent good; Also this *Medicine* is very effectual: Take two *Drams* of *Sublimate Mercury* in Powder, beat it well in a Stone *Morter* with the Juice, or inward substance of a *Cittron* without the Rind, put thereto a little *Water* and *Vineger*, then take one Ounce of *Allom*, and as much *Sope*, all which mingle together, and let them boil until a third part be consumd, and with this wash the *Sores*.

To kill the Canker in a Dogs Ears.

Take *Sope*, Oyl of *Tartar*, *Sal Armoniack*, *Brimstone*, and *Verdigrease*, of each one Ounce, mix them well together with strong *Vineger*, and rub the Sore therewith.

Of Dogs bitten by a mad Dog.

If your Dogs are bitten by one that is *mad*, there is nothing better than the licking it with their own *Tongues*, if they can reach the place; if not, then wash it with *Butter* and *Vineger* made luke-warm, and anoint it afterwards with *Venice Turpentine*. It is also good to *piss* often into the Wound; but above all, the Juice of the Stalks of strong *Tobacco* boyled in Water, and bathe the place therewith: Also wash him either in *Sea-water*, or in Water artificially made *Salt*: Also give him inwardly a little *Mithridate* in two or three Spoonfuls of *Sack*, and so keep him apart; and if you find him after some time still to droop, without hopes of Recovery, the best way is to hang him.

Of Worms.

Hounds are apt to have *Worms* within them, especially when young: It is good to give them about a Pint of warm *Milk* early in the Morning, with about half an Ounce of *Flower* of *Brimstone* in it, and let them fast at least two hours after it. This will warm and scowr them, causing them to be free of all inward filth; or if you think good, make *Pills* of *Aloes*, *Hartshorn*, the Juice of *Wormwood*, with some *Flower* of *Brimstone*; of this give them the quantity of a *Hasel Nut* wrapt up in sweet *Butter*, forcing it down his *Throat* by pulling out his *Tongue* and so putting it down, and when he draws in his *Tongue* it will slip in of it self.

Concerning Dogs that are furbaited in their Feet.

Dogs are often *furbaited* in their Feet, occasioned by runing long in hot Weather upon hard, dry, uneven ways, amongst rocky and sharp *Gravels*: For preventing this; If your *Huntsman* be careful, he will have their *Feet* look't after as aforesaid: But if through carelessness their *Feet* become sore, then cause them to be washed with broken *Beer* and fresh *Butter* luke-warm, and then to bind to the Soles of their *Feet* a *Salve* made of young red *Nettles* small chopt, or beaten into an *Oyntment*: *Soot* finely powdered and beaten with the yolks of *Eggs*, and applyed to their *Feet* is also very good: Also the *Juice* of the Herb *Mouse-ear* is very good for the like occasion.

Of Bruises.

If your *Dogs* chance to receive a *Bruise* through any fall, or the push of a *Stag* or *Buck*; if it appear outwardly anoint the swelling with a Decoction of *Chickweed* and *Groundsel* boyled in strong *Ale*, and that will asswage the swelling: But if it be a Wound, lay a *Plaister* thereon of the *Roots* of great *Cumfrey*, *Mellilot*, and *Oyl* of *Roses*, of each a like quantity, and cut away the *hair* near the *Wound* for the sticking of the *Plaister*.

If you suspect the *Bruise* to be inward, give them a *drench* of a Pint of new *Milk*, and put therein a quarter of an Ounce of *Irish Slate* or *Sperma Cæti*, or for want of these two, take half an Ounce of *Stone Pitch* finely powdred.

To cure the biting or stinging of Venomous Creatures.

It sometimes happens that *Dogs* are bit and stung by Venomous *Creatures*, as *Snakes*, *Adders*, *Toads*, and the like. For *Cure*, Presently squeez out the *clotted Blood*, and wash the place with *Salt* and *Urine*; then lay a *Plaister* to it made of *Callimint* beaten in a *Morter* with *Turpentine* and *yellow Wax*, until it become a *Salve*. If you give him some of the *Juice* of *Callimint* to drink with *Milk*, it were not amiss; or one *Ounce* of *Treacle* dissolved in some sweet *Wine*.

Obstructions in the Bladder.

Sometimes *Dogs* are troubled with *Impediments* in the *Bladder*, and can't *piss*: To *Cure* which, give them a Decoction of *Mallows*, or *March-Mallows*, *Brambles*, the *Roots* of *Fennel*, and the *Leaves* or *Seeds* of *Archangel* that commonly grows by *Vines*, of each an equal quantity; and let them boyl until a third part be consumed; and when it is luke-warm give it the *Dog* in a *Drenching-horn*, and it will cause him to *piss*.

Cankers and Sores in Dogs Ears.

For the *Cure*, take *Verjuice* and *Cheveril Water* mixt together, and wash the *Ears*.

To keep Bitches from being Proud.

Before a *Bitch* hath had *Whelps*, give her every Morning for about a Fortnight, eight or nine *Corns* of *Pepper* in her Meat, and she will not become *Proud*.

To heal Wounds on a Dog.

Take the *Juice* of red *Colewort*, and squeez into the *Wound*, and it will cure it in a few times dressing.

CHAP. V.

Hunters Terms of Venery.

In *Hunting* observe that there are *Beasts* of the *Forest*, which are *Beasts* of *Venery*, *Beasts* of *Chase*, and *Beasts* of the *Warren*. *Beasts* of *Venery* are the *Hart* and *Hind*, the *Hare*, *Boar*, and the *Wolf*. And here note, That with the *Hart* or *Stag* is included all other *Red Deer* of *Antlier*. *Beasts* of *Chase* are the *Buck* and *Doe*, the *Fox*, *Martern*, and the *Roe*. And *Beasts* of the *Warren* is the *Coney*.

Betwixt *Beasts* of *Venery* and *Chase* there are great differences. Those of *Venery* make their abode all day in great *Coverts* and secret Places in *Woods*, and in the Night season seek for *Food* in *Meadows*, *Lawns*, and pleasant feeding places; whereas those of *Chase* reside in the day in the *Fields* and open places, the better to avoid danger of surprizing; and in the Night season feed as the rest in the *Meadows*. But to proceed to the *Terms* of *Art* used in *Venery*.

The *HART* is called the first year a *Calf*, or a *Hind-Calf*, the second year a *Knobler*, the third a *Brocket*, the fourth a *Staggard*, the fifth a *Stag*, and the sixth a *Hart*. If hunted by the *King* or *Queen*, and he escape, for ever after he is called a *Hart-Royal*: And if the *King* or *Queen* think fit to make *Proclamation* for his safe Return, as was formerly the Custom, he is then called a *Hart-Royal proclaimed*.

The *HIND* is called the first year a *Calf*, the second a *Hearse*, and sometimes we say a *Brocket's Sister*, and the third year a *Hind*, and so she continues.

The *HARE* is called the first year a *Leveret*, the second a *Hare*, and the third a great *Hare*.

The *WILD-BOAR* is called the first year a *Pig* of the *Sounder*, the second a *Hog*, the third a *Hogs-steer*, and the fourth a *Boar*, at which Age, if not before, he leaveth the *Sounder*.

The *BUCK* is called the first year a *Fawn*, the second a *Pricket*, the third a *Sorel*, the fourth a *Soar*, the fifth a *Buck* of the first Head, and the sixth a *Buck*, or great *Buck*.

The *DOE* is called the first year a *Fawn*, the second a *Teg*, and the third a *Doe*.

The *BADGER* is called the first year a *Whelp* or *Pig*, and afterwards a *Badger*.

The *ROE* is called the first year a *Kid*, the second a *Girle*, the third a *Hemuse*, the fourth a *Roe-Buck* of the first Head, and the fifth a fair *Roe-Buck*.

The *FOX* is called the first year a *Cub*, the second a *Fox*, and afterwards an old *Fox*.

The *OTTER* is called the first year a *Whelp*, and afterwards an *Otter*.

The *MARTERN* is called the first year a *Cub*, and the second a *Martern*.

The *CONET* is called the first year a *Rabbet*, and afterwards an old *Coney*.

Terms of Art used for Beasts *of* Venery *and* Chase, *as they are in Company one with another.*

A *Heard* of *Harts*, as also of all other sorts of *Deer*, is at least Twenty, but six *Roes* make a *Heard*.

A *Bevy* of *Roes*, a *Sounder* of *Swine*, and a *Rout* of *Wolves*, are at least Twelve in number.

A *Brace* or *Leese* of *Bucks*, the like of *Foxes* and *Hares*. A *Riches* of *Marterns*, and a *Couple* of *Coneys*.

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A *Hart* or *Buck* goeth to *Rut*; the *Roe* to *Tourn*, the *Boar* to *Brim*, the *Fox* to *Clickitting*, the *Wolf* to *Match* or to *Make*; the *Otter* hunteth for his kind; and the *Hare* and *Coney* goeth to *Buck*.

Terms for their Noiſe at Rutting time.

A *Hart Bellweth*, a *Buck Groaneth* or *Twateth*, a *Roe* alſo *Bellweth*, a *Boar Freameth*, a *Fox Barketh*, a *Badger Shrickets*, an *Otter Whineth*, a *Wolf Howleth*, and a *Hare* and *Coney Beateth* or *Tappeth*.

Terms for their Ordure.

THe *Ordure* or *Excrement* of every Beaſt of *Chaſe* or *Venery* hath his proper *Terms*, for thereby their place of *Feeding* and *Eſtate* is known, and therefore neceſſary to be underſtood. The *Ordure* of a *Hart*, and of all *Deer*, is called *Fewmets* or *Fewmiſhings*, and all *Beaſts* that live of *Browſe* ſhall have the ſame *Term* in that reſpect; but in *Beaſts* of *Prey*, as the *Boar* and the like, they ſhall be called the *Leſſes*. Of *Vermine* and ſtinking *Chaſes*, as the *Fox*, *Badger*, and the like, they are called the *Fuants*; of an *Otter* the *Sprayats*, and of the *Hare* and *Coney* the *Crotiles* or *Crotiſings*.

Terms for the footing and treading of Beaſts of Chaſe and Venery.

FOr a *Hart* the *Slot*; for a *Buck*, and all *Fallow Deer*, the *View*. Of all *Deer*, if on the *Graſs*, or where it is ſcarce viſible, it is called *Foiling*; for a *Fox* the *Print*; for other *Vermine* the *Footing*; for an *Otter* the *Marks*; for a *Boar* the *Trait* or the *Treading*; and for a *Hare* diverſly; for when ſhe *winds* or *caſts* about to deceive the *Hounds*, ſhe *doubleth*; when ſhe is in the open *Field*, ſhe *foreth*; and when ſhe beateth on the hard *High-ways*, and her *footing* can be perceived, then ſhe *pricketh*; and in *Snow* it is called the *Trace* of a *Hare*.

Terms for Lodging of Beaſts.

A *Hart Harboureth*, a *Buck Lodgeth*, a *Roe Beddeth*, a *Fox Kennelleth*, a *Badger Eartheth*, an *Otter Watcheth*, a *Boar Coucheth*, a *Hare Seateth* or *Formeth*, a *Coney Sitteth*, and a *Martern Treeth*.

Terms for Lodging *and* Diſlodging *of Beaſts.*

YOu ſhall ſay *Harbour* and *Unharbour* a *Hart*, and he lyeth in his *Layre*; *Lodge* and *Rouze* a *Buck*, and he lyeth in his *Layre*; *Seek* and *Find* the *Roe-Buck*, and he *Beddeth*; *Form* and *Start* a *Hare*; *Bolt* and *Burrow* a *Coney*; and both the *Hare* and *Coney* do *ſit* and *ſquat*. *Kennel* and *Unkennel* the *Fox*; *Earth* and *Dig* out the *Badger*; *Watch* and *Vent* the *Otter*; *Couch* and *Rear* the *Boar*; *Tree* and *Bay* the *Martern*; and *Train* and *Raiſe* the *Wolf*.

Terms for the Tails *of Beaſts of Chaſe.*

THe *Tail* of a *Hart*, *Buck*, *Roe*, or any other *Deer* is called the *Single*; that of a *Boar* the *Wreath*; that of a *Coney* or *Hare* the *Scut*, that of a *Fox* his *Buſh*, and that of a *Wolfe* his *Stern*.

Terms for the Attire *of* Deer.

OF a *Stag* or *Hart* if perfect, the *Burr* is next the Head; the *Pearls* are the little knobs about it; the *Beam* is that whereon the *Antliers*, and the *Sur Antliers* are; and all the reſt until you come to the *Crown*, *Palm*, or *Croche*, which is the top, are *Royals* and *Sur-Royals*, and the little *Streaks* in the *Beam* are *Gutters*.

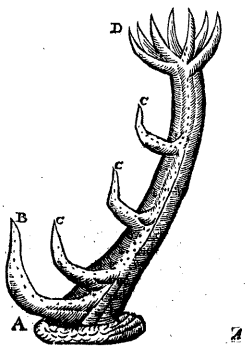
Of a *Buck*, you may ſay the *Burr*, the *Beam*, the *Brown-Antlier*, the *Black-Antlier*, the *Advancer*, *Palm* and *Spellers*.

If the *Croches* grow in form of a *Mans* Hand, it is called a *Palmed Head*. *Heads* not bearing above three or four, the *Croches* being placed above, and all at one height, are called *Crowned Heads*. And *Heads* having Doubling *Croches*, are called *Forked Heads*, becauſe the *Croches* are on the Top of the Beam like *Forks*.

When you ſpeak of a *Harts* or *Bucks Horns*, call them the *Head*; and not the *Horns*.

The *Head* or *Horns* of a *Deer* when it firſt cometh out, hath a *Ruſſet Pil* upon it, which is called *Velvet*, and his *Head* is called a *Velvet Head*; and when it is grown out to the full Bigneſs, he rubbeth off that *Pill*; and that is called the *Fraying of his Head*; and afterwards he *burniſheth* the ſame, and then his *Head* is ſaid to be full *Summed*.

I ſhall here give you the *Figures* of a *Harts Head*, or *Horns*.



A is called the *Burr*, and that which is about the *Burr*, is called *Pearls*.

B Is called the *Brow Antliar*.

C Thoſe which are the ſecond third and fourth, are called the *Sur-Antliers*, or *Beam-Antliers*; And all that grow from the *Brow-Antlier*, until you come to the *Crown*, *Palm*, or *Croche* are called *Royals* and *Sur-Royals*.

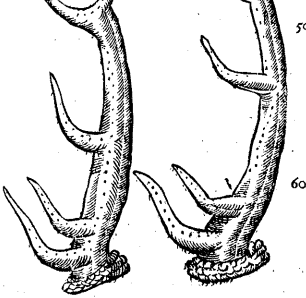
D The little *Buds* or *Braches* that are about the top, are called *Croches*, or generally *Croches* of ſo many on the top as they are.

Fig. I.

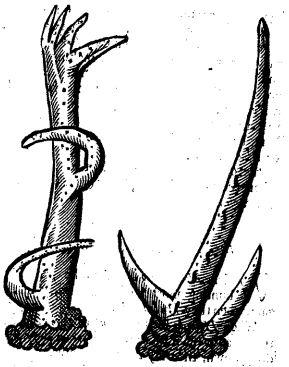
Fig. II.

Fig. I. This *Head* is called a *Palmed Top*, becauſe the *Croches* which grow in the *Top*, are formed like a *Mans Hand*.

Fig. II. All *Heads* that bear not above three or four, the *Croches* being placed aloft, and all of one height in form of a Cluſter of *Pears* or *Nuts*, are called *Heads* of ſo many *Croches*.



All *Heads* which bear two in the *Top*, or having their *Croches* doubling in manner as theſe are here deſcribed, are to be called *Forked Heads*, becauſe the *Croches* are planted on the *Top* of the *Beams* like *Forks*.



All *Heads* that have double *Burs*, or the *Antliers*, *Royals* and *Croches* turned downwards, contrary to the faſhion of other *Heads*, according to theſe *Figures*, are to be called *Heads* only.

Terms of Fleaing, Stripping and Caſing of Beaſts.

THe *Hart* of all ſorts of *Beaſts* is *ſtean*; and you muſt ſay, Take off the *Deers Skin*; *Strip* or *Caſe* the *Hare*: The *Fox*, *Badger*, and all manner of *Vermine* are alſo *Caſed*; and you muſt begin at the *Snout* or *Noſe* of the *Beaſt*, and ſo turn his *Skin* over his *Ears* all along his *Body*, until you come to his *Tail*, and that muſt hang out to ſhew what *Beaſt* it was.

The Seaſons for Beaſts of Chaſe.

THe *Hart* or *Buck* beginneth at the end of *Fence-Month*, which is Fifteen days after *Midſummer*, and holdeth till *Holy-rood-day*. The *Hind* and *Doe* begin at *Holy-rood-day* and laſt till *Twelfth-day* or *Candlemaſs*. The *Roe* from *Michaelmaſs* to *Candlemaſs*. The *Fox* and *Wolf* from *Chriſtmaſs* to our *Lady-Day*; the *Hare* from *Michaelmas* to the beginning of *March*; the *Otter* from *Shrovetide* to *Midſummer*; and the *Boar* from *Chriſtmaſs* to *Shrovetide*. *Coneys* are always in ſeaſon, either young or old; but their *Skins* are beſt in Seaſon from *Alhalantide*, to *Shrovetide*.

The *Fat* of all ſorts of *Deer*, is called *Suet*; and yet you muſt ſay, This *Deer* was a high *Deer* of *Greaſe*.

The *Fat* of a *Boar*, *Fox*, and *Badger*, is called *Greaſe*; and the *Fat* of a *Roe* is called *Bevy-greaſe*.

Pro-

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Proper Terms for the Noises of Hounds.

WHen *Hounds* are first cast off, and find some *Game*, say they *Challenge* or *Call* on; but if they are too busie before they find the Scent good, then say they *Bawl*: If too busie after they have found good *Scent*, then they *Babble*; and if they run it end-ways orderly, making it good, and then hold it merrily together, say they are in *Full cry*. When they have either Earthed a *Vermin*, or brought a *Deer*, *Boar*, or the like, to turn Head, then say they *Bay*; when *Hounds* hang behind and beat too much upon the *Scent* or *Place*, say they *Plod*; when they are earnest in the *Chase*, or in the *Earth*, they *Yearn*; and when they open in the String (or a *Grey-hound* is in *Course*) then they *Lapise*.

Other Terms to be taken notice of.

WHen *Hounds* or *Beagles* take fresh *Scent*, hunting another *Chase* until they hit it again, then they *hunt change*.

When *Hounds* hit the *Scent* of their *Chase* contrary, as to hit it up the Wind when they should do it down, then say they *draw amiss*.

When they *hunt* by the Heel, then they *hunt Counter*.

When the *Chase* goeth off, and cometh on again, traversing the same Ground thereby to deceive the *Hounds*, then they *hunt the Foil*.

The feeding *Hounds* after they have killed their *Chase*, is called *Rewarding them*.

When *Hounds* are in readiness, where the *Game* is expected to pass by, and are then cast off at the coming of the other *Hounds*, that is accounted a *Relay*.

When *Deer* have lately passed into *Thickets*, and then put the *Dogs* thereto for the *View*, such places are said to be *Entries*.

When any *Deer* is hard hunted, and then takes any *River* passing through it, say he *Takes Soil*; when he comes out, say he *Breaks water*; and when he leapeth into the *water*, and cometh out again the same way, then say he *Proffereth*.

When *Hounds* or *Beagles* run long without opening, or making any *Cry*, it is termed *Runing Mute*.

When *Hounds* run at a whole *Heard* of *Deer*, then they *run Riot*.

When at first finding the *Scent* of the *Game* they presently open and cry, 'tis said *they Challenge*: And when they draw on the *Scent* till they rouze the *Chase*, then they draw on the *Slot*.

When a *Roe Crosses* and *Doubles*, it is called *Trajoning*.

There are different Terms betwixt *Hounds* and *Greyhounds*: as, Two makes a *Brace* of *Greyhounds*, and a *Couple* of *Hounds*: Three a *Leese* of *Greyhounds*, and a *Couple* and a half of *Hounds*. You must say, Let *slip* your *Greyhound*, and *Cast off* your *Hound*. The *String* used to lead a *Greyhound*, is called a *Leese*, and for a *Hound* a *Lyame*. The *Greyhound* hath his *Coller*, and the *Hound* his *Couples*.

When *Huntsmen* go drawing in their *Springs* at *Hart-hunting*, they usually make *Dew-rounds*, which are called *Ring-walks*.

When *Deer* rub and push their Heads against *Trees*, to cause the *Pills* or *Velvet* of their new *Horns* to come off, it is said they *Fray*.

When *Deer* cast their *Horns*, they *Mew*.

When the *Huntsman* endeavoureth to find a *Hart* by the *Slot*, and then mind his *Step* to know whether he is great or long, then say, He is known by his *Gate*.

When *Beagles* break and cry at their *Prey*, then they *Yearn*.

A *Rain Deer* resembleth a *Hart*, but hath his Head full of *Antliers*.

When *Hounds* find where the *Chase* hath been, and made a proffer to enter, but returned, then say, there is a *Blemish*; and when *Hounds* in readiness expecting the *Chase* to pass by, and then to cast them off before the rest comes in, this is termed a *Vaunt lay*.

When a *Hare* takes the Ground like a *Coney*, which is but rarely seen, then say she goeth to the *Vault*, and when she is Coursed on Rotten Ground, or in *Frosty Weather*, so that it sticks to her *Feet*, then say *she Carieth*.

To beat the *Bushes* after a *Fox* is termed *Drawing*.

A *Pricker* is a *Huntsman* on *Horseback*.

When you see about *Twenty Deer* of what sort soever together, it is a small *Heard*; about forty is a Middle *Heard*, and sixty or eighty a great *Heard*, be they *Male* or *Female*.

Upon View of a *Hart*, if he be a goodly *Deer*, do not call him fair but great; and so a great *Hind*, and a great *Buck*, but a fair and comly *Doe*.

When a *Deer* eateth in *Corn*, or *Grass-field*, he is said to *Feed*, otherwise to *Browze*; and if he stayeth to look on any thing, he is said to *stand at Gaze*; when he forceth by, upon force he *Trippeth*, and when he runs a pace he *Streineth*. When he is hunted and leaves the *Heard*, then he *Singleth*; when he Foams at Mouth he is *Embossed*; when he *Smelleth*, or *Venteth* any thing, then say he hath this or that in the Wind; when he holds out his Neck, at full length inclining, then say he is *spent*; and being Dead, say *he is done*.

The *Reward* to the *Hounds*, is called the *Reward* or Quarry.

When a *Huntsman* beats a Wood to find a *Chase*, 'tis called *Drawing* the *Covert*, and when he seeth where any *Deer* hath been, say *here he breaketh*.

When some few *Hounds* are set in readiness, by any place where 'tis supposed, the *Chase* will pass, 'tis termed *A Vaunt Lay*; and when they tarry until the rest of the *Hounds* come in, it is called *An Allay*; but if they hold till the *Kennel* be past, then 'tis called *A Relay*.

When a *Hart* entreth a *River*, or *Pool* which is termed the *Soil*, say he descendeth; when you see him ready to enter the Water, say he *proffereth*, and if he doth it the second time, then he *Reproffereth*; and after he hath once descended, and you see where he hath trod the Water, filling his Foot-

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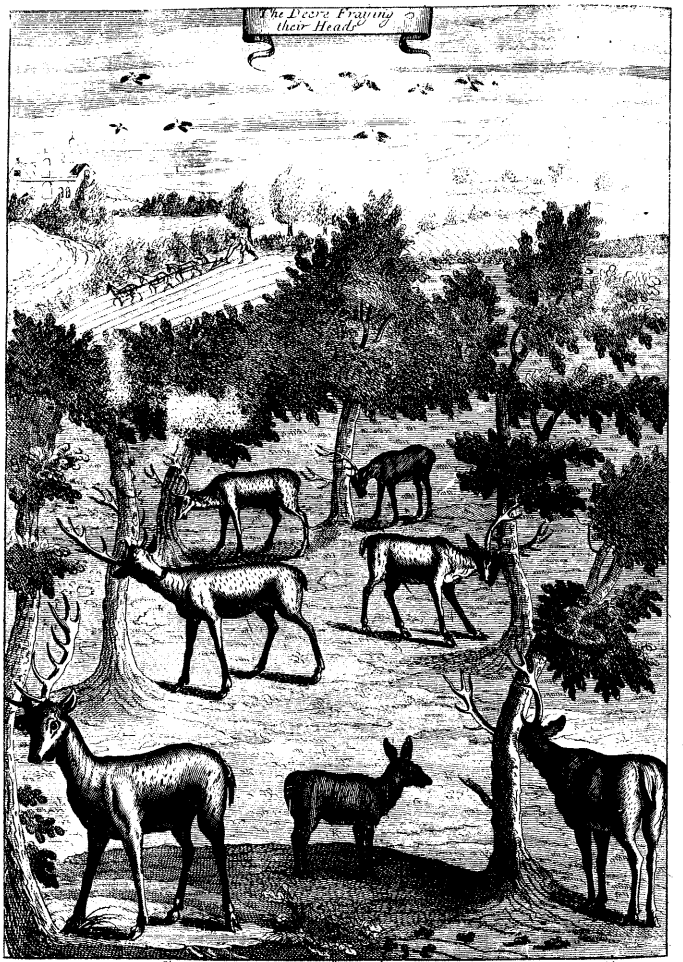

To the Right Honourable Claudius Lord Pusly, Kilpatrick, Mountcastle, first and Legall issue Male from Arran, Cheife of the most noble family of Parliamentt signed by al the three & her issue y. Rightfull heyre of the huyre to the only Sister of King Iames

This Plate humbly dedicat

SEMPER VIRESCENS

VIRTUTE ROBORATA

Hamilton &c. Earle of Abercorne, Lord Hamilton and Baron of Strabane, Iames Duke of Chastleherault, Earle of Hamilton, whose family is by Act Estates) declared next Queen Mary Crown of Scotland: he being Son & the Fourth

by Richard Blome.

Foot-steps, then say here the *Hart Defouleth*, and the *Slot* or *View* that is found of such a *Deer*, on the other side of the Water is to be termed as of a *Deer Defoulant the Soil*. The *Hart*, *Buck* and *Boar*, do oft times take *Soil* without enforcing; and all other *Beasts* are only said to take Water except the *Otter*, and he is said to beat the *Stream*.

When they Cast about a *Grove* or *Wood*, with the *Blood-Hound*; they make a *Ring*, when they find where the *Deer* hath passed, and break or plash any *Bough* downwards for a Mark, then say, They *Blemish*, or make *Blemishes*. When they hang up any *Paper*, *Clout* or *Mark*, it is called *Sewelling*, or setting of *Sewels*. When a *Hound* meeteth a *Chase*, and goeth away with it far before the rest, then say, he *Forelayneth*. When a *Hound* Hunts backward the same way that the *Chase* is come, then he *hunts Counter*; and if he hunts any other *Chase* than that which he first undertook, then he *hunts Change*. When any *Deer* or other *Chase* useth any Subtilties to deceive the *Hounds*, then say, they *Crost* or *Double*.

When a *Hart* or *Stag* breaks *Herd*, and draweth to the *Covert*, say, he goeth to *Harbour*, or taketh his *Hold*, or he *Covereth*; and when he cometh out again, then he discovereth himself.

There is great difference betwixt the *Feet* of *Preying Beasts* and those of a *Deer*; for in those of *Prey* they are called *Traces*; but the *Tract*, or *Footing* of a *Deer*, is called the *Slot* or *View*.

There is also a difference betwixt the *Frith* and the *Fell*, the *Fells* being taken for the *Valleys*, *green Compastures*, and *Mountains*; and the *Friths* for *Springs* and *Coppices*.

There is also a difference betwixt the word *Ways* and *Trenches*; for by the first is meant the High and Beaten Ways on the Out-side of a *Forest* or *Wood*; and by the word *Trench*, is every small Way not so commonly used.

There is likewise a difference betwixt a *Trench* and a *Path*, which is a place where a *Deer* hath only left *Slot* or *View*.

Blemishes are the *Marks* left to know where a *Deer* hath gone in or out, and they are little *Boughs* plashed or broken, to hang downwards; for any thing that is to hang up, is called a *Sewel*.

Thus having treated of the several Terms of *Art* most used in *Hunting*; the next business shall be, to treat of the several sorts of Beasts of *Venery* and *Chase*; and first of the *Hart* or *Stag*.

CHAP. VI.

Of the HART or STAG.

IT is observed, that this *Creature* of all other *Deer*, hath the most ingenuity, and yet the most fearful; and by his *Windings*, *Turnings*, and other Subtilties, as runing into *Herds*, forcing others into his *Footings*, and taking refuge amongst *Herds* of *Cattle*, doth oft deceive the *Huntsman*, and put a Foyl upon the *Dogs*; for in his *Chase* (which often proves long) neither *Hedge*, *Ditch*, or *River* doth stay him, but taketh all with great fierceness: Notwithstanding all which he is ensnared; for the *Dogs*, who pursue him by his *Scent*, being animated and encouraged by the *Huntsmen*, he becomes their *Prey*.

The *Hart*, as also the *Hind*, are very long lived, being said to live about One hundred years. They are bred in most *Countries*, but *England* is said to breed the best.

This *Creature* doth excel all others in the Beauty of his *Horns*, which are very high and large; yet do they not grow to their *Scalps* or *Bones*, but to their *Skin*, branching forth into many *Speers*, being solid throughout, and as hard as *Stones*; every Year in the *Spring* (as all other sorts of *Deer*) they lose or shed their *Horns*, and during the time they are without, do abscond all the Day in Solitary places, and only feed out in the Nights. Their new *Horns* at the first come out like *Bunches*, and by degrees grow and become hard, being covered with a rough Skin, which is called a *Velvet-Head*; and as the said Skin dryeth, they *fray* or *rub* them against *Trees*, to scrape off the said roughness; and when they find, that in thus rubing them they feel no pain, 'tis a Rule to them, that their *Horns* are their sufficient guard, and so they leave those Retiring places.

At One year old they have no *Horns*, but only *Bunches*; at the Age of Two years they appear more perfect, but Strait and Simple; at Three years they grow into two *Speers*; at Four, into three, and so increasing every Year in their *Branches* until they be *Six*; and above that time their Age is not known by their *Heads*.

In what Season the Stags *or* Harts *Mew, and betake themselves to the Thickets and Solitary places.*

IN *February* and *March* they *Mew*, or *Cast* their *Heads*, that *is*, their *Horns*; and generally the old Ones sooner than the Young, and such that have some Distemper upon them, especially such as have been hurt at *Rut*, having lost their *Pissel* or *Stones*, do never *Mew*; for if you geld one before he hath an *Head*, he will never bear *Head*; and also, if you *Geld* him when he hath his *Head*, or *Antler*, he will never Cast it; and if you *Geld* him when he hath a *Velvet Head*, it will always remain so.

When *Harts* have *Mewed*, they betake themselves to the *Thickets*, as aforesaid; but Young Ones do never, until they have born their Third *Head*, which is in the Fourth year of their Age.

In *March* and *April* they begin to thrust forth their *Buds*, about Mid *June* their *Heads* will be *Somed*, and about the latter end of *July*, when they find them to dry, they go to the *Trees* to

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Fray their *Heads*, and to rub off the *Velvet*, as aforesaid.

Of Fraying their Heads.

HAving *Frayed* their *Heads*, then they burnish them in the *Clay*, and other commodious places they can meet with fit for that purpose.

Some bear *Red Heads*, some *Black*, and some *White*; all which do proceed from Nature only. The *Red Heads* are commonly greater and fairer than the rest, and are lighter than the *Black*; and the *White* are the worst of all.

Rules to know an Old Hart *by the Slot, Fewmets, Carriage, Fraying, Posts; and by his Gate, Head, and Branches.*

IF when you would take his *Slot* or *Treadings* on the Ground, you find he hath a large *Foot*, a deep *Printing*, an open *Cleft*, and a long *Space*, you may be sure he is Old; if you find the Treadings of two, the one long and the other round, and both of one bigness; yet the long *Slot* was of the largest *Hart*; also the *hinder Feet* of the old *Hart* do never reach their former in their going, but the Young Ones do. Likewise the Old *Harts* are low Joynted, and do never tread double, or falsly; because the *Sinews*, that hold the *Joynts* of their *Feet* and *Claws*, are better reinforced than the young *Harts*, who are not so well able to sustain the weight of their *Body*, so that their *Feet* and *Claws* are sometimes forced to turn away and double, by which they may be judged young.

There is a great difference between the *Slot* of the *Stag* or *Hart*, and the *Hind*; for there is no *Hart* of the Second Head so young, that leaveth not a greater and wider *Slot* than the *Hind*; and the *Bones* will also appear greater; but when *Hinds* are with *Calf*, they open their *Claws* wide like a *Hart*.

You may also know an Old *Hart* by its *Fewmishings*, or *Fewmets*, though they are not at all times alike. In *April* and *May* they Cast their *Fewments*, or *Excrements*, as it were in *Cakes*; and if they be long and thick, 'tis a sign of an Old *Hart*. In *June* and *July* they Cast them forth in great *Croteys*, but soft; and from thence to the end of *August* they hold the same form and dimension, but are very hard and knotty. But although these are the general Marks to know an Old *Hart* by, yet sometimes it falls out contrary; For when they have been disturbed, or received some hurt, then they make their *Fewments* oft-times dry, and sharp at one end, especially at such times as they *Fray* their *Heads*. There is also a difference betwixt the *Fewments* of the Morning, and that in the Evening; for those that he makes when he goeth to *Relief* at Night, are better digested, and moister than those that he makes in the Morning, because he hath taken his rest all Day, and so doth make a perfect digestion; whereas in the Night he is forced to seek his Feed.

The Age of a *Stag* or *Hart* may also be judged by his *Carriage*, or *Bearings*; that is to say, when he passeth through any *Branched Wood*, and with his *Head* bruiseth the under *Boughs*, and that indifferent high, and of a good distance, 'tis a sign he is well Spread, and Old. This Judgment may be given all the Year, except in the Months of *March*, *April*, *May*, and *June*; at which times they *Mew* their *Heads*, and bear their *Velvet* and *Bloody-heads*. His Greatness is also known by the height of his *Entries* into a *Wood*; for the Young ones creep, but the Old Ones, are stiff and stately.

All *Stags* or *Harts*, as they are burnished, beat or rub their *Heads* against some *Tree* or other, which is termed their *Fraying-Post*, as before taken notice of; and the Elder the *Hart*, is, the sooner doth he go to *Fray*, and the greater is the *Tree* that he seeketh to *Fray* upon, and such as he can't bend with his Head. The Younger make use of weaker and lower *Trees*, by which their Age may be also known, as also the nearest to their *Harbour*; this being the last Ceremony used by them before they enter it.

The Plate of *Fraying* their Heads, shews their Age.

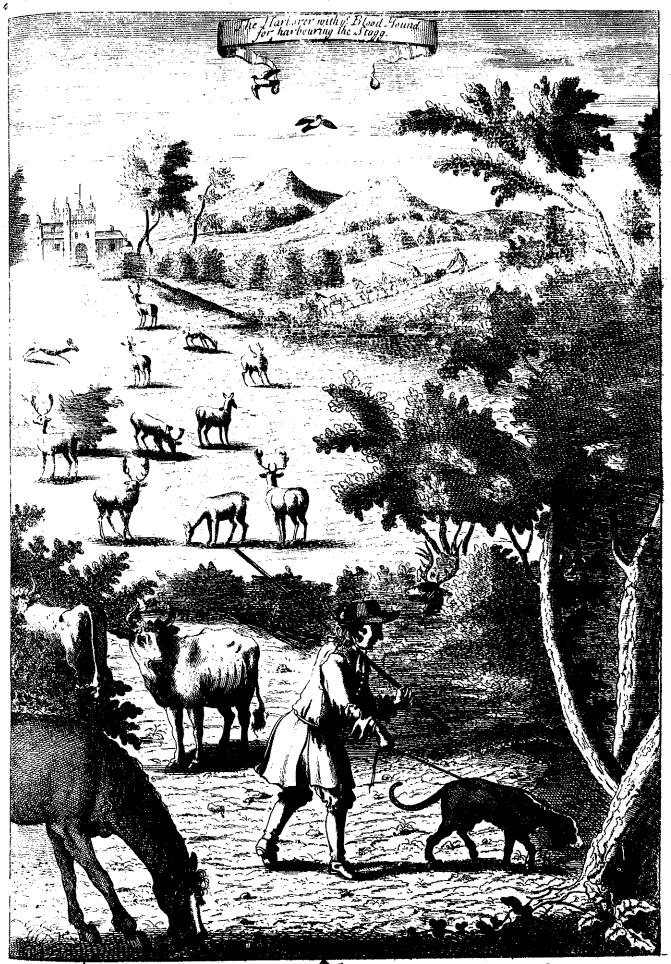
By the *Gate* or Going of an *Hart*, his Age may be judged, for the Elder he is, the longer will his Pace be, and the longer will he run or stand up before the *Dogs*, as being more swifter, lighter, and better breathed. Also the *Stag* or *Hart* that leaveth a great *Slot* of his *Fore-feet*, doth never stand up long when he is Chased; and a *Hart* that hath a long *Foot*, hath a greater *Body* than those that are round *Footed*. His *Age* is likewise guessed by the height and bigness of his *Legs*.

In *April*, *May*, and *June*, there is no Judgment to be had from the *Horns*, by reason they Cast them in *February* or *March* (as before noted,) and are not well furnished with their whole *Carriage* till the beginning of *July*; and sometimes later, if the Soil be not good, and the Season fair.

By the *Branches* of a *Stags-Horns* his *Age* may be known; for the First Year they have no *Head*, that is, *Horns*; the Second they have *Prickets*; the Third they bear four, six, or eight *Branches*; the Fourth, eight or ten; the Fifth, ten or twelve; the Sixth, twelve or fourteen; and at Seven Years old they leave their Heads *Beamed*, *Branched* and *Somed*, with as many as ever they will bear; for after that Year they increase in bigness, but not in number; and yet after they are seven, eight, ten, twenty, thirty, or forty Years Old they may be guessed at, though not with certainty; for they have their *Cahoge* large and thick, they are strong Breasted and Burred, and their *Heads* are very open.

Of Rutting of Harts.

THe time of their *Rutting* or *Vaulting*, is about Mid *September*; and during that Season they are such great lovers of the Sport, that



To the Right Worshipfull S.r Thomas Bludworth of Leather-head in the County of Surrey Knight: This Plate is Humbly dedicated by Ric. Blome

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that they mind nothing else, and with a greedy desire seek out the *Hinds*, following them by their *Scent*; and during the time of their *Rut*, they eat very little. They are exceeding hot and burning with Lust, insomuch that where they find any Water, they lye and tumble in it to cool their Heat; and in this lustful raging Season they have a peculiar Noise: But the *Hinds* are more Chast, not desiring Copulation so oft, if they were not constrained to it by the *Harts*; so that one *Male* will serve for several *Females*: And the elder they are, the better they are, and therefore go to *Rut* before the young ones. Nor will they suffer the young ones to come near the *Hinds* until their *Venery* is over, or pretty well spent, which when they perceive, they run upon them, forcing them away, and so become Masters in their Rooms.

Their *Lust* being over, and having spent some time in their Solitary Retirements, they return to their Pastures, and live in *Herds* as before.

The *Hinds* being thus filled, never keep Company with the *Harts* until delivered of their young, which is in eight Months; during which time they lodge in some *Covert*, taking care of their young, until fit to shift for themselves.

During the time of their *Rut* they are very easie to be killed; for they follow the *Paths* and *Ways* where the *Hinds* have gone, putting their *Noses* to the Ground to follow them by the *Scent*, not regarding the danger they are in of being taken, which at other times they are careful of.

Of the Coats and Colours of Harts.

THere are three several sorts of *Harts* or *Stags*, *viz.* the *Red*, *Brown*, and *Fallow*; and of every one of these *Coats* there proceeds two sorts of *Harts*, the one great, and the other small. Of brown *Harts*, some are great, long, and hairy, bearing a high *Head* of a reddish colour, which is fair and well beamed: This sort will hold a good *Chase*, being swifter of *foot*, and longer of *breath*, than those of a shorter Stature, which are well set, are fatter and esteemed better *Venison*, as being in young *Springs* and *Coppices*, rather than in high *Woods*. They are very subtile, especially when in their *Grease*, Nature teaching them to be then more cautious, as being sensible they can't hold out a *Chase*.

If they are old, and feed in good *Pastures*, their *Heads* are black, fair, well branched, and generally *palmed* at the top.

Those that are of a lively *red Fallow*, having a black or brown List down the ridge of their *Backs*, and their *Legs* of the same colour, are strong, and have fair and high *Heads*, which are well *furnished* and *beamed*.

The *Fallow-Hart* or *Stag* doth bear his *Head* high, is of a whitish colour, hath small *Beams*, with long, slender, and ill grown *Antliers*, and hath neither courage nor force.

The *Harts* or *Stags* of a lively *red* are commonly young ones; and such do stand up long, maintaining a good *Chase*.

Their changing their Food according to the Seasons of the Year.

STags or *Harts* are said to change their manner of *Food* according to the several Seasons of the *Year*, which is necessary to be known by every expert *Woodman*. I will begin at the end of their *Rutting*, which is about the end of *October*.

In *November*, when they cease to *Rut*, they frequent *broomy* and *heathy Fields* and *Places*, where they may crop off the tops of those *Shrubs*, which are very strengthening unto them, after their works of Nature hath exhausted them: And sometimes they lye in such like *heathy* and *broomy* Places in the hot Months of the year.

In *December* they *herd* together, and withdraw into the *Forests* to have harbour from the cold *Frosts*, *Snows*, *Wind* and *Rains*, and do then feed or browse on *Elder Trees*, *Brambles*, *Bryers*, *Hawthorns*, *Holmes*, and such like things that they can find green; and in the time of *Snows* they feed on the *Rinds* or *Barks* of *Trees*.

In *January* they leave *herding* with the rascally *Deer*, and keep together in small *herds* near the skirts of the *Forests*, where they may find green *Corn*, or good *Winter Pasture*.

In *February* and *March* they *mew* or *cast* their *Heads*, and then seek out good fresh *Pasture* and *green Corn* for their Night food, lying close in the *Woods* all the day until their *Heads* are grown again.

In *April* and *May* they rest in the *Thickets*, and such like retiring places, seldom stirring out of their *Harbours*, but for food in the *Nights*, much coveting *green Corn*: And in these *Months* they go not to *Soil*, by reason of the moisture of the *Spring*, and of the Dew that is on the *Grass* or *Corn*.

In *June*, *July*, and *August* they visit the *Copices* and *Spring Woods* during the heat of the Day; and in the Nights frequent *Corn Fields*, no *Grain* coming amiss; but they most delight to feed on *Wheat*, *Oats*, and *Pease*.

In *September* and *October* they begin to leave the *Thickets* and go to *Rut*; and in these Months they have no certain *harbour* or *food*, but follow the *Tract* of the *Hinds*, as before noted, not regarding who seeth them, pursuing the *Hinds* with such rage and heat of *Lust*, that they never mind eating any thing but what accidentally they meet with, which for the most part are *Mushrooms*, which is a great Provocative to *Venery*: And they are in this *Season* easie to be killed, were their Flesh good and wholsome, as it is not.

Directions how to use the Bloodhound *or* Suithound, *for the finding out or Harbouring the* Hart, *or* Stag.

THe next thing to be Treated of, shall be to find out the *Hart*, or *Stag* where his *Harbour* or *Lare* is; for the effecting of which get up early in the Morning; and be sure not to go with

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with the Wind, for the *Hart* is very quick of Scent, and will make away upon the leaſt fault; and if you go not betimes, *Cattle* will be let out, and ſtiring up and down may chance to tread out the *Slot* where he hath paſſed. You muſt be provided with a *Bloodhound*, *Draughthound* or *Suithound*, which muſt be led in a *Liam*, according as in the Plate is repreſented, and for the quickning his *Scent* 'tis good to rub his Noſe with *Vineger*.

When his *harbour* or reſting place is found, and that you have lodged him, all things ought to be prepared for the *Hunting* him the next Morning; For in thoſe *Months* that he is in the Pride of his *Greaſe*, he retires from Feeding back to his *Layre*, about Sun-riſing; and for the moſt part, if not always, to one and the ſame place, unleſs he meet with ſome notable diſturbance in the interim.

Harts do go to their *Layre*, commonly in the *Springs*; and although they were drawn into ſome ſtrong hold, or Thicket, yet if they be old crafty *Deer*, they will return ſometimes to the ſides of the *Coppices*, to hearken or ſpy if there be any thing to anoy them; and if they chance to vent the *Huntſman* or his *Hound*, they will immediately diſlodge from thence, and go to ſome other place.

When the *Huntſman*, or *Harbinger* doth perceive that 'tis time to beat, let him put his *Hound* before him, and beat the outſide of the *Springs* or *Thickets*, and if he find a *Hart*, or *Deer*, let him ſee if the *Slot* be freſh or not, and he may alſo know by the drawing of his *Hound*, although ſometimes one may be deceived by them, when the *Miſt* or *Dew* is great, which taketh off the *Scent*; But if the *Hound* ſtick well upon the *Scent*, then let him hold him ſhort for fear leſt he *Lapiſt* (that is open,) for in the Morning a *Hound* will draw better when he is held ſhort, than if he were let at the length of the *Liam*; and let him draw till he come to the *Covert* where he is, and if poſſible, *harbour* him, marking all the Signs, as the *Slot*, his *Entries* and the like, to know what manner of *Deer* he is.

Then let him *plaſh*, or bruiſe down ſome ſmall *Twigs*, ſome above, and ſome below, and whilſt his *Hound* is hot in the purſuit, let him beat the outſides, and mark his *Ringwalks* twice or thrice about the Wood, one while by the great and open ways, that he may help himſelf by his *Eye*; another while through the *Covert*, for fear leſt the *Hound* ſhould overſhoot him, for he will have better *Scent* in the *Covert*, than in the *Highways*. And if he find that the *Deer* be not gone out of the *Ringwalk*, or that he hath drawn amiſs, then let him go to his Marks, which he hath plaſhed or bruiſed, and draw Counter until he may take up the *Fewmet*, as well made in the evening *Relief*, as in the *Morning*; and let the place where he hath fed be marked.

If the *Huntſman* find two or three places where he hath entred, and as many where he hath come out, in this caſe the freſheſt entry muſt be taken notice of; for a *Hart* doth oft times go in and out of his *harbour* in the Night, eſpecially if he be an Old Crafty *Deer*, and will uſe great Subtilties, beating one place too and fro divers times. In this caſe the *Huntſman* muſt take his Compaſs and *Ring-walk* the greater about the *Covert*, thereby to encompaſs all his *Entries* and *Goings* out, and let him ſuffer his *Hound* to draw almoſt to the *Harts Layre* or *Harbour*, and being near it, then draw with more care, checking your *Hound* that he ſpends not when he comes ſo near as to have him in the *Wind*; and having diſcovered that you ought to draw him, retire ſome diſtance back; and if you perceive him not diſturbed, make your ſecond round a little nearer which will ſecure him in his *harbour*; ſo that having broken a *Bough*, or plaſhed ſome *Twigs*, as aforeſaid, for your Directions, leave him till the next *Morning* when you intend your *Chaſe*.

For the finding out a *Hart* by the *Eye* in the *Springs*, obſerve over Night in what part the *Deer* goes to feed, and if it be in a *Spring*, obſerve which way to come in the *Morning* upon a cleat *Wind*, and chooſe a ſtanding in ſome *Tree* on the border of the *Spring*, from which all things may be diſcerned that feed therein. In the *Morning* be at the *Covert* before *Day*, and being near the *Deers harbour*, leave your *Hound* with ſome one that goes with you, that you may quickly have him on occaſion, and then get up the *Tree* to eſpy him, and there ſtay until he is gone to *harbour*, obſerving well the place where he entred; then diſcend the *Tree* and fetch the *Hound*; but do not begin to *harbour* him for an hour at leaſt after his going to *Layre*, for fear of his diſcovering you, and thereby loſe him. And if in caſting about the *Covert* any *Pyes* or *Jayes* make a chattering, then withdraw and ſtand cloſe, for that is a ſign he is yet on foot; ſo that ſtay about half an hour before you make your *Ring-walk*.

Oft-times thoſe that are crafty, as being chaſed with *Hounds*, and eſcape, do afterwards betake themſelves for a long time to cloſe *Thickets*, and feed in ſmall *Groves* or *Coppices*, that have been lately felled, within large *Coverts*; and this they do moſt commonly in *May* and *June*, more than in any other Seaſon of the Year, by reaſon they go not much to the Water, but content themſelves with the *Dew* and moiſture of the *Earth*; but in *July* and *Auguſt* the drought and heat is ſuch that forceth them out for *Water*, and when they go out they retire into their Holds two or three hours before day.

For the finding out ſuch crafty *Deer*, obſerve this method. When you find the *Slot* of a *Hart* in a thick *Covert*, that is two or three days old, and that the Ground is broken with ſuch old Tracts, then caſt about and beat all the outſides; and if you find that he hath not gone out or in, then conclude he keepeth within: In ſuch caſe get under the *Wind*, and enter the *Covert*, holding your *Hound* ſhort, and if he hath any thing in the *Wind*, and that you find you are not far from the *Hart*, then withdraw for fear of rouzing him, and go into the *Covert* at ſome other ſide that is not ſo thick, and take up what *Fewmiſhings* you find; but go not into ſuch places until about Nine of the Clock in the *Morning*, becauſe ſuch *Harts* do oft take *harbour* within thoſe little *Coppices* to enjoy the comfort of the

Sun,

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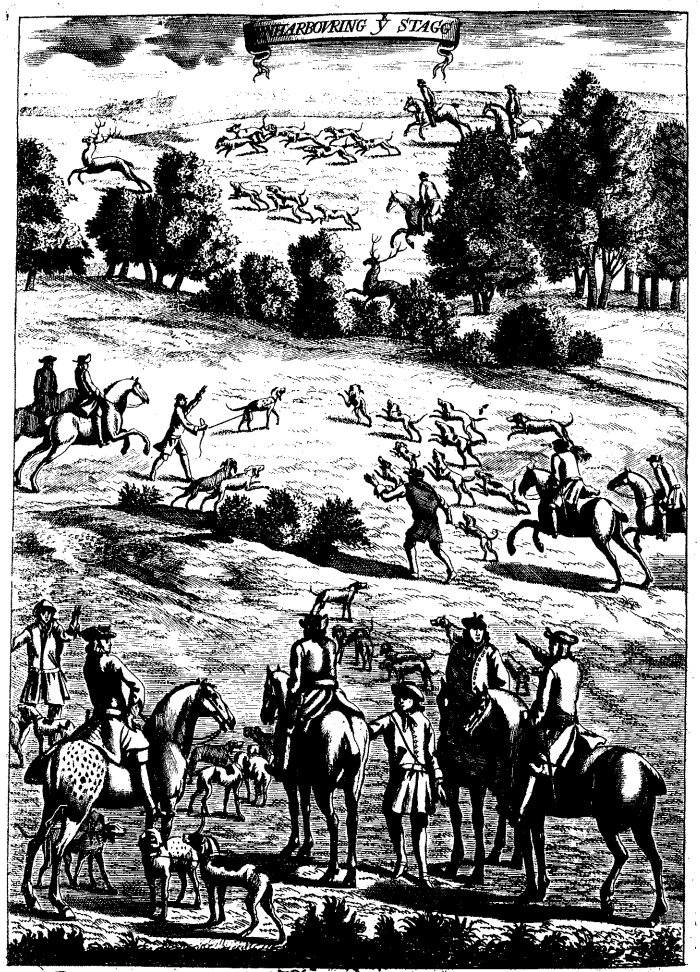

To the Worship
full Henry
Sallop of
Farligh in
the County of
Southampton Esqr
This plate is humbly dedi-
cated by Richard Blome.

Sun, and after Nine a Clock do withdraw to the ſhady Places. Nor muſt you be too over-haſty in entring the *Thickets*, becauſe that the *Harts* do ſometimes take *Layre* near thoſe privy *Coppices*: Therefore let it ſuffice to have ſeen the *Slot* freſh, and to have taken up the *Fewmiſhing*, and ſo retire as privately as you can.

The *Huntſman* or *Harbourer* muſt be ſtirring early to ſeek the *Hart* in ſuch places, becauſe that they withdraw into their *Coverts* before Day, that they may not be diſturbed by *Cattle* or *People*, who oft-times break the *Slot*, and render it undiſcernable.

But to proceed to the *Chaſe* of the *Hart*. The *Horſmen*, *Huntſmen* and *Hounds*, being all ready prepared in the Field by Day-break, having their *Harbenger*, *Bloodhound* or *Draughthound*, in readineſs, they begin the *Chaſe*.

The Chaſe of the Hart or Stag; and firſt the Unharbouring him.

THe *Huntſmen* muſt diſperſe themſelves about the ſides of the *Wood*, according to the beſt advantage, to eſpy, if it be a *Deer*, according to the *Harbengers* deſcription, and when he breaks Covert, to give notice thereof to the Company by blowing a *Recheat*; and if the Hounds run *Riot* (that is, Chaſe ſome raſcally *Deer*) then they muſt be rated; that is, ſtop them by words of correction, or the like.

But your *Hounds* ſhould not all be uncoupled until the *Hart* is unharboured by the *Harbourer*, and caſt off the *Staunch Hounds* firſt, which having undertaken the Chaſe, caſt off the reſt; and the *Hounds* being in full cry, the *Horſmen* ſhould ſecond and encourage them with *Voice* and *Horn* as aforeſaid, to the end the whole Field may know how, and where the *Game* goeth. But now adays few *hunt* the *Hart* as they ought, for they give not their *Hounds* leaſure to *hunt*, ſo that it is more properly to be ſaid the *Horſes hunt* than the *Hounds*; and there is ſo many on *Horſback* that can neither *blow*, *hollow*, or do any thing belonging to *Hunting* as they ought, and which mingle themſelves amongſt the *Hounds*, croſſing them, and breaking their Courſe, that 'tis impoſſible for *Hounds* to hunt true.

As ſoon as you can get ſight of the *Deer*, to ſee if it was the ſame that was *Unharboured*, or a freſh one, (for by his ſubtilties, if poſſible, he will put ſuch a Sham upon the *Hounds*;) if it be a freſh one, then rate them back, and bring them to the Default.

The *Horſmen* ought all along to ſecond and encourage the *Hounds*, and to keep them to *Hunt* cloſe, aſſiſting them at every Default, if they have either loſt the *Slot* or follow not the right. They muſt alſo be careful to watch his *Windings* and *Doublings*; for when he finds himſelf cloſely purſued, he will uſe many ſhifts and endeavours to give them the change, to preſerve himſelf; And being put to his laſt extremity, it is almoſt incredible to believe what ſtrange contrivances he will uſe to ſhun the fury of his purſuing Enemies; for ſomtimes he will hide himſelf cloſe to the *Earth*, permitting the *Dogs* to come up to him, whilſt in the mean time he puts his *Feet* cloſe under his *Belly*, and draws his Breath cloſe by the freſh *Earth*; Nature having taught him to know that the *Scent* of his *Feet* and his *Breath* are the chief diſcoverers of his *doublings* and *changes*. Somtimes when he is cloſe hunted, he will run from *Covert* to *Covert*, to find out ſome others, and put himſelf in their company. If he find himſelf nor ſafe, he will directly return by his firſt Path to break his *Traces*, and then ſhoot out into ſome great *Road* or *Highway*, the light Duſt keeping neither *Scent* nor *Impreſſion*; and in ſuch caſe the *Huntſmen* both *horſe* and *foot*, muſt be diligent to look about to encourage the *Hounds*, and to ſearch for his *Slot*, and to bring up the *Dogs* in freſh cry, ſome times the *Stag* being cloſe *hunted*, will run with the Wind, thereby to leave no *Scent* of his *Breath*, and but little of his *Feet* behind him: Some *Harts*, when they are *hunted*, will on a ſuddain make themſelves as if quite tired, and caſt themſelves on the Ground until the *Hounds* are within Twelve-ſcore of them, and then they will ſtart up, and run more nimble than before, truſting in their force. Somtimes he will take *Soil*, that is, the *Water*, covering himſelf all under it, except his *Noſe*; ſomtimes ſwim down the *Stream*, and ſomtimes croſs the *River*; In ſuch caſe the *Huntſmen* muſt have a ſpecial regard to the old *ſtaunch Hounds*, who will *hunt* leaſurely and careſully, whereas the young ones will over-ſhoot their Game. In all theſe Accidents, the *Horſmen* and *Huntſmen* muſt be diligent to look out, and cheriſh the *Hounds*, blowing them a *Recheat*.

The *Stag* may better be diſcovered at a diſtance, when he is Spent, than when he is nigh and hollowed at; for when he ſeeth no man, he beareth down his *Head*, which denoteth his wearineſs; whereas when he ſeeth any one, he raiſeth up his *Head* that they ſhould think him ſtrong, ſtout, and not tired.

When he is towards his fall, the *Hounds* will hold in cloſe together, and come on ſtrongly, by reaſon that when he is almoſt *Embaſſed*, he caſts out of his mouth a white *Froth* or *Flaver*, which is very ſweet and delightful to the *Hounds*: Beſides, the *Swet* of his *Body* running down his *Legs*, leaves a ſtrong *Scent* on the Ground, which is a ſure ſign to the *Dogs* that he is ſinking: And hence it is that they are always ſo luſty and jocund towards the end of the *Chaſe*.

If the *Hart* takes into any dry Champain Ground, and that 'tis very hot, and little or no Wind ſtirring, ſo that there is no *Scent* to be had, and that the *Hounds* are almoſt ſpent for want of breath, and through extremity of labour give out; in ſuch caſe the *Huntſman* muſt *blemiſh* in the laſt *Slot*, and caſt off the *Dogs* to ſome convenient place to refreſh them with *bread* and *water* until the heat be paſt, and then return back

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to the same *Blemish*, putting the *Bloodhound* on it, and draw before the *Hounds* until they have found the *Hart* again, and so follow the *Chase* as before.

The Stags taking Soil.

WHen he is quite spent, one of his last Succours is to take *Soil*, and when he once descends he swims down Stream to leave no *Scent* behind him, and keeps in the middle for fear of touching the *Boughs* or other things that hang in the *Water*. In this case the *Huntsmen* must have an eye to the *Blemishes* where first he took *Soil*; for 'tis easie to discover by the *breaking of the Water*, that is the place where he took *Soil*, and there you may soon perceive which way he *makes head* by the breaking down the *Grass* and *Weeds*, better than by the *Slot*, which at the first forsaking of the *Soil* is generally spoiled and defaced by the *Water* that runs down his *Legs*. Somtimes he will not only descend, but continue in the *Soil*, hiding himself all except the tip of his *Nose*, as before taken notice of; and peradventure at a time, and in such a place, when and where you are unwilling to hazard your *Dogs*: In such Case procure a *Boat*, or else some of the *Huntsmen* must unstrip, and see to wound him with a *Sword*; or else to throw over a *Rope* about his *Horns* to noose him. But this is a desperate attempt, and he had need be sure that the *Hart* is out of his reach of Ground, otherwise he will endanger his life, or spoiling. Nor is there less skill required at the last, when he is spent, and the *Dogs* are at *Bay* on *Land*, for then he endangers *Horse* and *Man*: You must therefore wisely go to work, for the chief glory in a Victory is to be without loss or hurt.

The Hart or Stag at Bay.

AS to the *Land Bay*, if the *Hart* be *frayed*, and burnished, then the place is well to be considered of; for if it be in a *Hedge side*, or *Thicket*, then whilst he is stareing on the *Hounds*, you may come covertly amongst the *Bushes* behind him, and so kill him; but if you miss, and he turn Head upon you, it is convenient to take refuge behind some *Tree*; or when he is at *Bay*, Couple up your *Hounds*; and when you see him turn head to fly, Gallop in roundly and kill him with your *Sword* or *Gun*, before he can have time to turn head upon you; But if he be at *Bay* in a plain and open place, where there is no *Wood*, *Tree*, nor *Covert*, 'tis dangerous and difficult to come to him.

The Death of the Stag, with the Ceremonies to be observed therein.

HE that gives the falling blow, ought of right to sound the *Recheat*, to assemble together the rest of the Company, as also the *Dogs*; also at the Death of a *Stag*, there are several Ceremonies that should be observed.

When the *Huntsmen* come in to the *Death* of the *Hart*, they should cry *Ware Haunch*, that the *Hounds* may not break in to the *Deer*, which being secured, the next business is to cut his *Throat*, and to *Reward* the young *Hounds* with the *Blood*, to make them in love with a *Deer*, and learn to keep at the *Throat*; then having sounded the *Mot*, or *Morts*, he that is to break him up (that is, to *take say*,) first, slits the *Skin* from the cutting of the *Throat* downwards, making the *Arber*, so that the *Ordure* may not break forth; then he is to be *Paunched*, and the *Hounds* to be rewarded therewith. Another Ceremony is, the *Huntsman* presents the Person that took the *Essay* with a drawn *Hanger*, to have a Chop at his *Head*, and after him, every one hath a Chop if it is not cut off; and generally the *Huntsman*, or *Keeper* is provided with such a *Hanger*, that is not over Sharp, that there may be the more Chops for the gaining more *Fees*, every one giving him a *Shilling* at least: which done, the *Huntsman* takes up the *Head*, and shews it to the *Hounds* for their Encouragement, Rewarding the Young ones with the *Blood*. And the concluding Ceremony, is to blow a Treble *Mot* by one, and then a whole *Recheat* in Consort by all that have *Horns* Bare-headed, with a general *Ho-up*: Upon which they depart Home; the Hart is carried away in a Cart, together with the Head, and the *Hounds* coupled up, and carried Home by the *Keeper*.

And you must observe that the *Bloodhound* must be first *Rewarded*, for that Honour belongs to him; and when he hath done, then *Reward* the rest, especially the young; and as near as you can let your *Rewards* be given them Hot, which is much better than cold, which is the ill Custom of many *Huntsmen*.

But it hapneth very often, that through some accident or other the *Hart* escapeth; now for the recovering the *Chase* the next day, let there be some Marks set, where the *Chase* is left off; and go to that place with your *Bloodhound*, together with the *Kennel* of *Hounds* behind them, and let him that hath the best *Hound*, and most tender Nosed, undertake to draw endways in the Tracts and ways that the *Hart* most probably went (for they do most commonly run endways, as far as they have force) and then if they find any *Water* or *Soil*, they continue sometimes therein, which doth so stiffen their *Joynts* at their coming out, that they can't go far, nor stand up long; so that they are constrained to take *Harbour* in any place they can find, that is *Covert* where they may feed as they lye, and let some others draw to you out of the *Coverts*, by the most comodious places for them to mark, and for the *Hounds* to vent in; and if any chance to find where any hath leapt, or gone, he shall put the *Hound* to it, *Hooping* twice, or blowing two *Mots* with his *Horn*, to call in his Company, and the rest of the *Kennel* to come in; and if it be the *Hart* which they seek, let the best *Hound* be put thereunto, and let the Company separate themselves, and go several ways to the outsides of the *Covert*, and if they find where he hath gone into some likely *Covert* or *Grove*, then let the *Hounds* be drawn near unto them, and beat cross through it;

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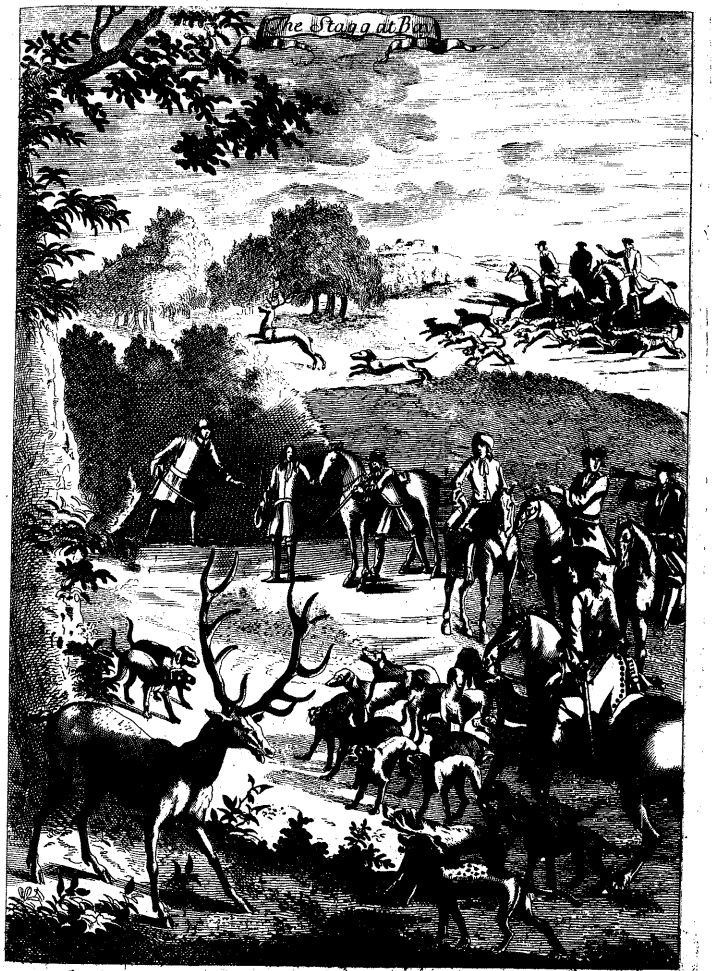
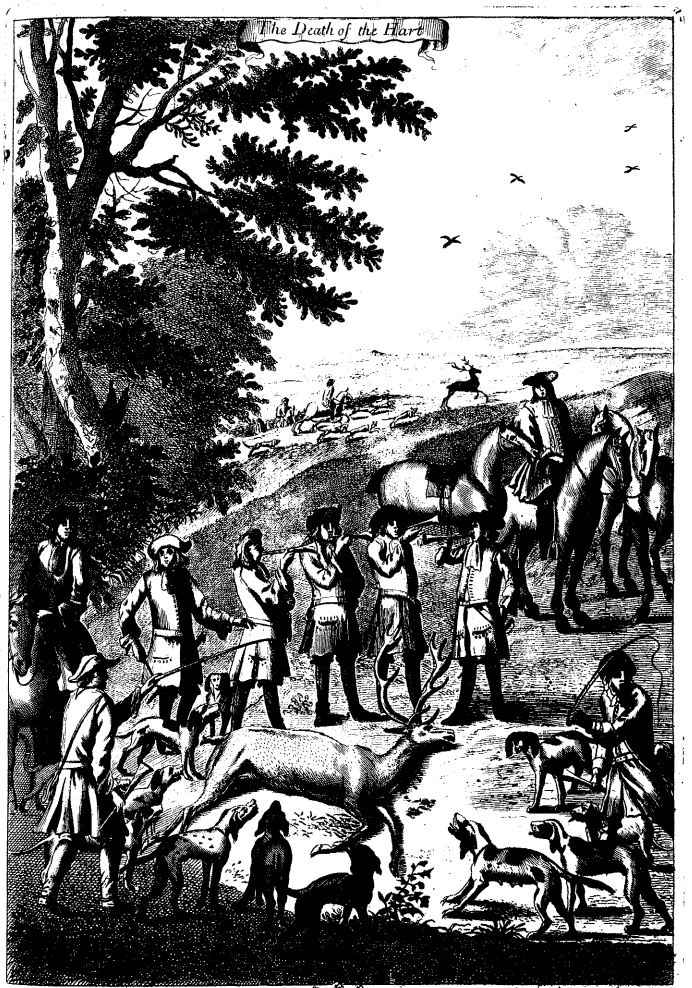


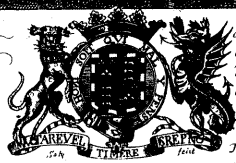
To the Right Honourable Francis Viscount Newport
of Bradford, Treasurer of his Majestyes Household,
and Lord Leiutenant of the County of Salop &c.

This Platt is Humbly Dedicated by

Richard Blome.



To ye Rt. Noble Henry Duke of Worcester, Baron Herbert President, & Ld. Leivtenant of of ye Counties of Glocester, Hereford, Bristoll: Ld. Warden of his Majtys of St. Briavells, Kt. of the most noble Majtys most Honble Privy Councell &ct.



of Beaufort, Marquess & Earle of Chipstow, Raglan, & Gower: Ld. Wales, & ye Marches: Ld. Leivtenant & Monmouth, & of ye Citty & County of forest of Dean, & Constable of ye Castle order of the Garter, & one of ye Lds. of his

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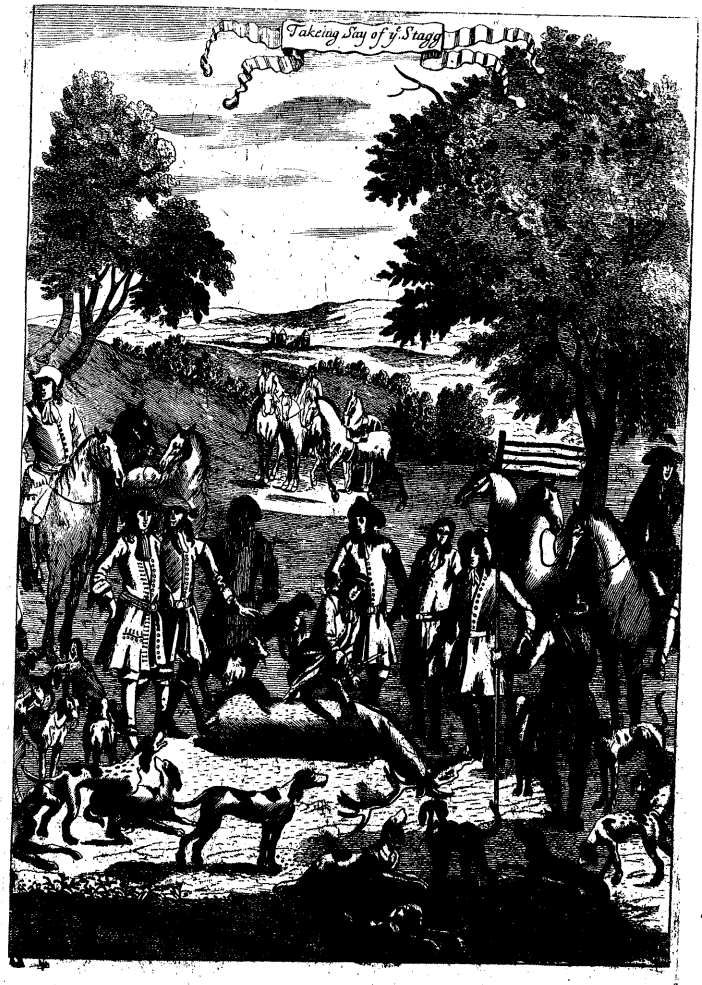

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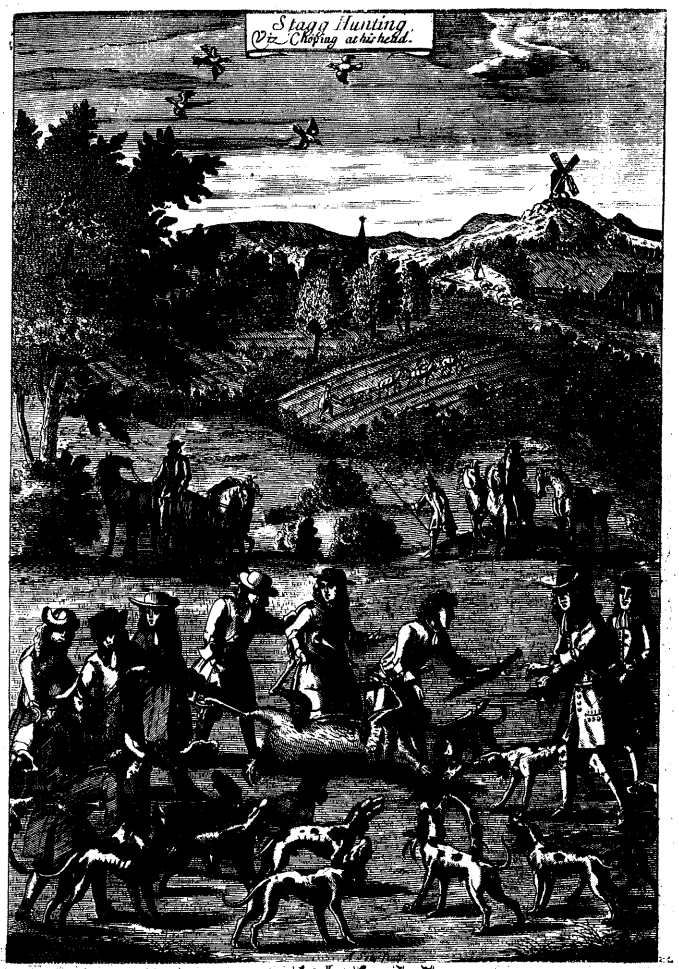

To the R^t Honble William Stanley Earle of Derby
Lord Stanley & Strange Bar^n of Weeton Ld Mohun
Ld Leiutenant of Lancashire and Cheshire and Admi
rall of the seas thereto belonging Chamberlaine of
Chester and Lord of Man and of the Isles

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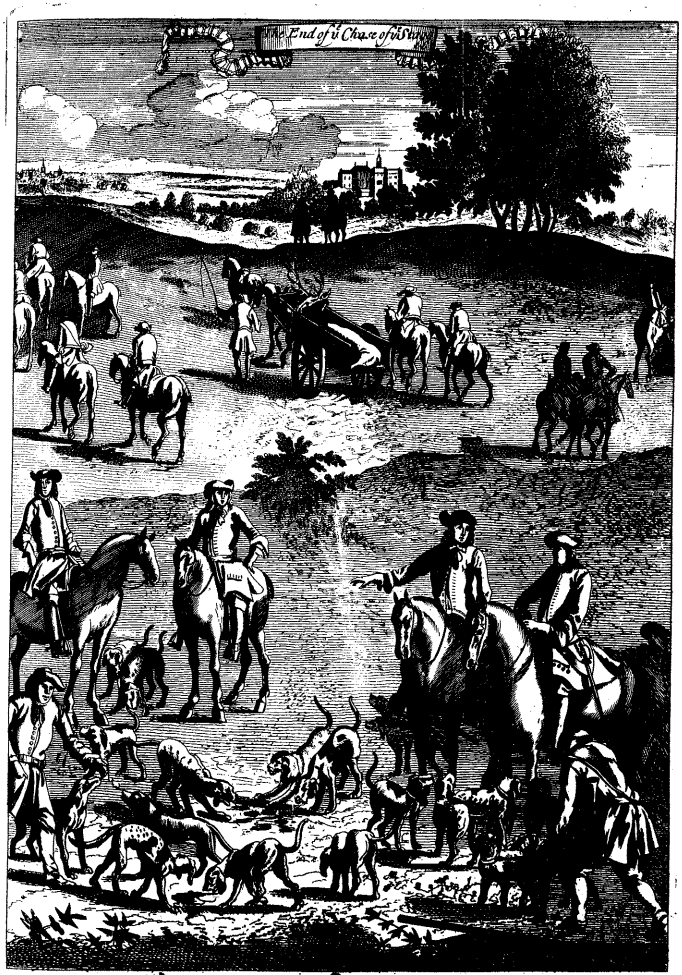

To the Honourable S.r Arthur Rawdon
of Rawdon Hall in the West Rideing of
York Shire Baronet.

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it; and if they renew their *Slot*, they muſt conſider whether it be the right or not; and if he that draweth perceiveth it to be the right, let him blow two *Mots*, to call in the Company; and if he chance to find five or ſix *Layres* one after another together, do not take it for a *Herd* of *Deer* as many think; for when a *Hart* hath been long run and ſpent, he will make many *Layres* together, becauſe he can't well ſtand up to Feed, but Feeds lying.

For the Hunting the *Hart* or *Stag*, I ſhall not deſcend to every Particular; for 'tis an Exerciſe that requires both your *Wit*, *Patience*, and *Policy*, with relation to the variations of the *Ground*, *Situations*, *Woods*, *Rivers*, and an hundred more Accidents that may intervene; this *Chaſe* ſeldom or never being after one and the ſame manner, but different according to the *Weather*, the condition of the *Dogs*, and the ſtrength of the *Hart*, with many other Conſiderations that require your Skill, or elſe you may chance to loſe the *Hart* by default, which amongſt *Woodmen* is a diſgrace. He ſhould be therefore wiſe and bold, good at both fore and after Game; neither ought he to be diſcouraged at every little inconvenience; for being put off from his *Chaſe* through any accident of violent Storm, the Nights approach, or the like, he ought to *Blemiſh* on the laſt *View* or *Slot*, and to it again in the Morning with the *Draught* or *Blood-hound*, as before directed, and fear not ſucceſs; for 'tis the nature of the *Hart*, when he is cloſe run and almoſt ſpent, to make forth on *Head*, and to deſcend at the firſt *Soil*, to cool and refreſh himſelf, where he uſeth to continue (if not purſued) ſo long, that his *Limbs* become ſtiff, and almoſt diſabled from runing, and therefore betakes himſelf to the next ſhelter he meets with, and conſequently becomes an eaſie *Chaſe* the next Morning, if the *Huntſmen* underſtand their buſineſs, and follow the aforeſaid Inſtructions.

The Profits and Advantages of the Stag.

I Shall conclude this *Chapter* of the Princely *Hart*, with letting you know the Profits and Advantages, which are generally reputed to accompany this goodly Creature; and firſt for his *Skin*, which being dreſt is excellent for *Coats*, *Belts*, *Gloves*, and the like. His *Fleſh* ſurpaſſeth all other *Veniſon*, if in the *pride* of his *Greaſe*; otherwiſe it is reputed hard, dry, and melancholy: The *Calfs* and *Hinds*, are eſteemed better *food* than the *Harts*. The *Marrow* and *Sewet* are excellent for all ſuch *Oyntments*, *Plaiſters*, and *Cataplaſms*, as are deſigned for cold *Gouts* and hard *Tumors*. The *Horns* are ſaid to be *Antidotes* againſt Poyſon, being little inferiour to thoſe of the *Unicorn*, if there be any ſuch *Beaſt*; they are great Reſtoratives, and an excellent *Cordial* in *Fevers* and all Peſtilential *Diſeaſes*; and of *Harts-horn* there is made a moſt excellent *Jelly*, which is eſteemed very good for Elderly Men, eſpecially if married to young Buxſom Women: The *Horns* of a young *Hart*, whilſt they are tender, being cut into little pieces, and put into an *Earthen Pot* with ſome *Pepper* and *Myrrh*, and ſo ſet into an *Oven* until they be dry (the *Pot* being cloſe ſtopt) makes a ſingular Powder for the *Collick*, being mixt with *Wine*, and ſo drank.

The next is the *Blood*, which hath many excellent Virtues for all kind of *Fluxes* and *Poyſons*; beſides, it is effectually good to make the Skin ſmooth, and clear from all Roughneſs and Spots; and that makes ſo many Gentlemen waſh their *Hands* and *Faces* in the *Blood* of the *Stag* after it is newly opened, being hot.

In the *Heart* is found a *Bone*, no way inferior to the *Bezoar*, being good againſt all *Swoundings*, *Faintings*, *Tremblings*, and other Symptoms which affect the *Heart* and *Brain*; and is approved to be moſt excellent for *Women* in Labour, even beyond that of the *Eagle*.

In the laſt place, his *Pizzle*, or *Genital Member* waſht in Water, and that Water being drank, doth immediately eaſe and cure the *Collick*, *Stoppage* of the *Urine*, and ſeveral *Maladies* incident to the *Reins*, *Kidneys*, and *Uriters*: It is a notable *Aphrodiſiæ*, and uſed for that purpoſe. 'Tis alſo moſt excellent for all manner of *Fluxes*, for the *Pluriſie*, and *Bitings* of *Venemous Creatures*.

I ſhall not deſcend to give you Inſtructions, for the applying the aforeſaid Parts of the *Stag* to uſe, it being a Diſcourſe not ſo proper for the Subject in hand; but refer you to Books of *Phyſick*.

CHAP. VII.

BUCK HUNTING.

HAving ſaid ſo much of the *Hart* or *Stag*, as to his Nature, and the ways of *Hunting* him, there will remain ſo much the leſs touching the *Buck*, and the Rules for taking him, ſeeing that he that can hunt a *Stag* or *Hart* well, can't Hunt a *Buck* ill: Beſides *Fallow-Deer* being common amongſt us, and thoſe uſually in *Parks* and *Incloſures* of divers Scituations, and ſeveral Statures different from one another, 'tis a hard task to give Inſtructions for every particular; for in truth it is the proper *Art* of the reſpective *Keeper* of thoſe *Parks* or *Places*, to underſtand the Nature and Craft of his *Deer* in *hunting*; all which are to be acquired by Experience more than Reading, yet the Theorick is very good for the better attaining the Practick; however I ſhall in brief tell you what relates to *Buck-hunting*, as now adays uſed.

The great Skill required in *hunting* the *Buck* is to keep the *Hounds* from hunting *Counter*, or *Change*, in regard of the plenty of *Fallow-Deer*, which are uſually in the ſame Ground; nor is there required that Skill in *Lodging* a *Buck*, as *Harbouring* a *Stag*; neither need you draw ſo much after a *Buck*, but you may judge by the

View

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View, and obſerve what *Grove* or *Coppice* he enters; for he will not wander up and down as the *Hart*, nor change his *Layer* ſo oft, neither uſe ſo many *Croſſings*, *Doublings*, *Shifts* and *Devices*; nor doth he flee ſo far before the *Hounds*, and avoideth the *Highways* and open *Plains*, as much as he can: He is not ſo crafty and ſtrong to beat a *River*, or to ſtay ſo long at *Soil*; neither are they ſo free to take a great *River*, but being cloſe *hunted*, they flee into ſuch ſtrong *Coverts* as they are accuſtomed unto; and it hath been obſerved, that ſome *Bucks* that have leaped over a *Park-Pale*, after a *Ring* or two, have returned of themſelves, chooſing rather to dye where they are acquainted, than in a ſtrange place.

The *Buck* leapeth lighter at the *Rut*, than the *Stag*; and groaneth as the *Hart* belloweth, but with a worſe noiſe, and ratling in the *Throat*.

The *Buck* and *Hart* are not at amity together, ſhuning each others *Layers*; and being of a ſweeter Scent, are more coveted by the *Hounds*.

The *Does* begin to *Fawn* about the end of *May*, and continue till *Midſummer*.

The *Bucks Mew* or ſhed their *Horns*, or *Heads*, every year, about or in *April*, and part of *May*; and their new Ones are burniſht about the end of *Auguſt*.

The *Buck* makes his *Fewmiſhings* in divers manners and forms, as the *Hart*, according to the diverſity of his *food*, and the time of the Day, Morning and Evening; but moſt commonly they are round.

The *Buck* comes in Seaſon the Eighth of *July*, and goes out at *Holy-Rood*, which is the Fourteenth of *September*.

The *Doe* comes in Seaſon when the *Buck* goes out, and goeth out at *Twelve-Tide*.

As to this delightful Sport of *Buck-hunting*, the ſame *Hounds* are uſed which run the *Stag*. In *Foreſts* and *Chaſes*, as they lye at *Layer*, ſo they are hunted.

In *Parks* where they are incloſed, the Sport is not ſo good, by reaſon of the greater *Chaunce* and *Foyl*, unleſs they break out and run the Country, which they ſeldom do: But *Deer* that lye out, though near the *Park*, make generally better *Chaſes* than *Foreſt Deer*.

The Keeper Shooting a Buck to be Run down.

FOr facilitating the *Chaſe*, the *Keeper* commonly ſelects a fat *Buck* out of the Herd, which he Shoots to Maim him; and then he is Run down by the *Hounds*.

As to the way of *hunting* them, the Company uſually goes out very Early for the benefit of the Morning; ſometimes they have a *Deer* ready Lodged, if not, the *Coverts* are drawn until one is rouzed; or ſometimes in a *Park* a *Deer* is pitched upon, and forced from the *Herd*, then more *Hounds* are laid on to run the *Chaſe*; if you come to be at a fault, the Old *Staunch Hounds* are only to be relyed upon until you recover him again; if he be Sunk, and the *Hounds* thruſt him up, 'tis called an *Imprime*, and the *Company* all Sound a *Recheat*; when he is Run down, every one ſtrives to get in, to prevent his being torn with the *Hounds*. *Fallow-Deer* ſeldom or never ſtanding at *Bay*.

He that firſt gets in, cries *Hoo-up*, to give Notice that he is down, and Blows a *Death*. When the *Company* are all come in, they Paunch him and Reward the *Hounds*; and generally the chief Perſon of Quality amongſt them *Takes Say*; that is, Cuts his *Belly* open, to ſee how Fat he is: This done, every one hath a Chop at his *Neck*, and the *Head* being cut off is ſhewed to the *Hounds*, to encourage them to run only at *Male Deer*, which they ſee by the *Horns*, and alſo to teach them to bite only at the *Head*: Then the *Company* all ſtanding in a *Ring*, one Blows a *ſingle Death*; which done, all Blow a *double Recheat*, and ſo conclude the *Chaſe* with a general Hollow of *Hoo-up*, and depart the Field to their ſeveral Homes, or to the place of Meeting; and the *Huntſman*, or ſome other, hath the *Deer* caſt croſs the *Buttocks* of his *Horſe*; and ſo carrieth him Home.

CHAP. VIII.

Hunting the ROE-BUCK and DOE.

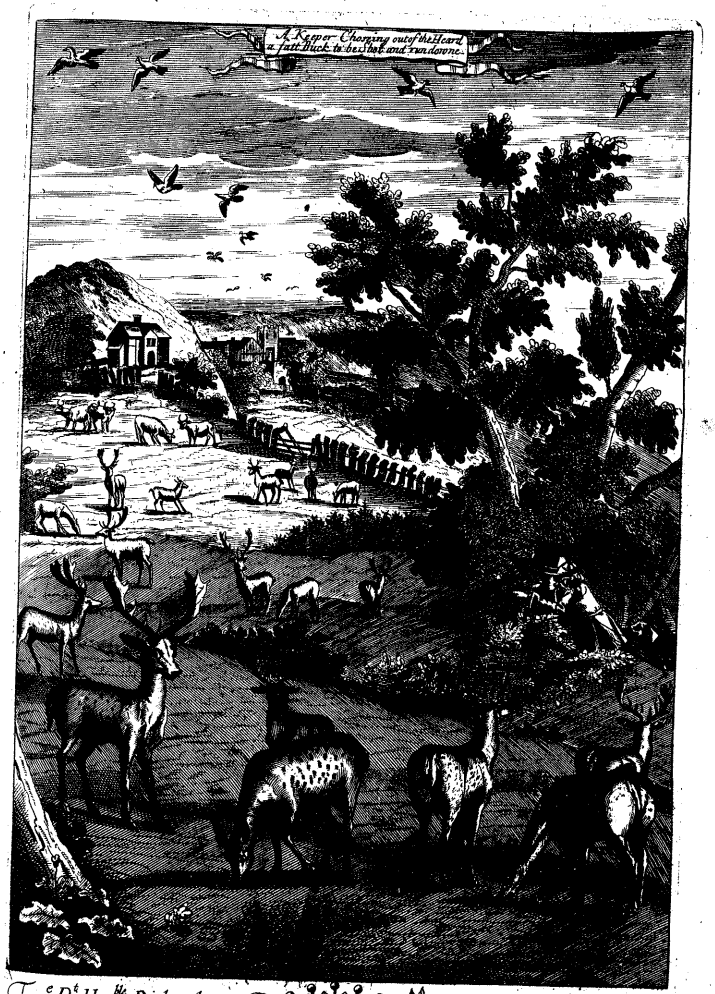
THe *Roe*, is a *Deer* well known in *Germany* in the *Helvetial Alps*, and in divers parts of *Africa*, where there is plenty of them, although not ſo amongſt us.

This *Beaſt* is ſaid to be of an exceeding quick ſight: They differ not much from the common *Deer* but in their *Horns*, which are ſet with ſix or ſeven *Branches*, not *Palmed*, but *Branchy*, and ſhorter than the *Fallow Deer*: And whereas the *Horns* of others are hollow towards the Root, whereunto entreth a certain long Subſtance, the *Horns* of theſe, as alſo of the *Fallow Deer* and the *Elk* are ſolid, yet full of Pores. They much frequent the *Mountains* and *Rocky places*, and are very ſwift of *foot*; and when they take *Soil* ſwim ſtoutly, like the *Hart*.

In *October* they go to *Rut*, or to their *Tourn*, and continue therein about fifteen days, and never accompany with any other beſides his own *Doe*; nor do they part until ſhe is ready to *Fawn*, and then ſhe withdraws a good diſtance, where he can't find her, it being his nature to kill the Young Ones.

The *Doe* generally brings forth Two, which commonly prove *Buck* and *Doe*, and ſhe keeps them out of the *Bucks* ſight until they are fit to ſhift for themſelves; and thoſe two being bred up together, do ſeldom part.

The *Fawn* the Firſt Year is called a *Kid*; the Second, a *Girle*; the Third, a *Hemuſe*; the Fourth,



To y.e R.t Hon.ble Richard Butler Baron of Weſton in England, Earle of Arran Dyſ.t Tolough & Baron of Clougrenan in Ireland, 2. Son to his Grace James Duke of Ormond, & one of y.e Lords of his Ma.ty most Honourable Privy Councell for Ireland &c.t

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To the Right Honorable James Earle of Perth, Lord Drummond &
Stobhall, Stewart of Strathern & Balushidder by Inheritance: Lord
Justice Generall of the Kingdome of Scotland, one of the Extraordi-
nary Lords of the Session, Anno Domin 1682. & now Lord High
Chancellor of y.e said Kingdome of Scotland &c.ta

This Plate is humbly dedicated by Richard Blome.

GANG WARRILY

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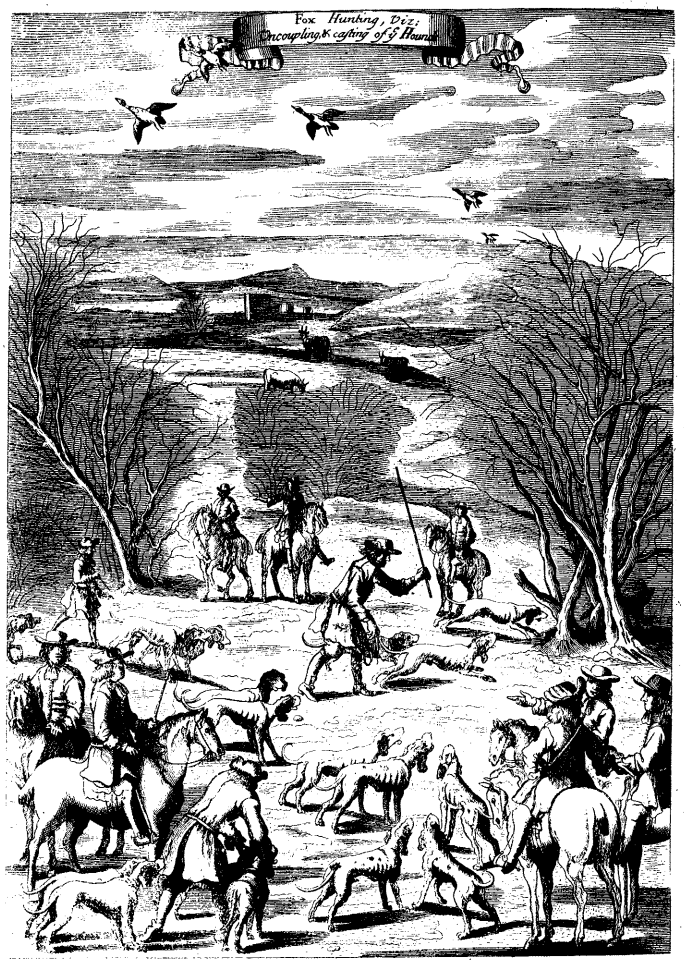

To the Right Honourable Thomas Earle of Ailsbury & Elgin, Viscount Bruce of Ampthill, Baron Bruce of Wharlton, Skelton and Kinloss, Hereditary High-Steward of ye Honour of Ampthill, Gentleman of his Majesties Bedchamber, Lord Lieutenant and Custos Rotolorum of ye Countys of Bedford & Huntington, Recorder & High-Steward of Bedford & Huntington &c.

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To the Right Honourable Iohn Drummond, second Son to Iames Earle of Perth Lord Drummond &c.ª By right of Mariage Baron of Lundin, & cheife of that Antient Family (which is Descended from Robert Bastard Son of William Sirnamed the Lyon King of Scotland) Lord Treasurer Depute, and one of his Ma.ties most Honourable privy Councell in Scotland &c.ª This Plate is humbly Dedicated by Richard Blome.

Fourth, a *Roe-Buck of the first Head*; and the Fifth, a *Roe-Buck*.

As soon as the *Buck* comes from his *Tourn* he Casts his *Horns*, and few of them after Two Years old fail to *Mew* about *Alhallontide*: Their *Heads* quickly grow out again, for that in *March* they *Fray* them. The *Buck* is always in Season (except in *Rutting* time,) but never very Fat.

You should be careful of *hunting* the *Doe* while she is big with Young, or indeed so long until her Young are fit to live without her, there being a Mercy and Compassion due to all *Beasts*; besides, their and our Creator hath inhibited the Seething of a *Kid* in the *Dams Milk*, whereby all such Cruelty is supposed to be forbidden, which Nature abhors.

They make an exceeding good *Chase*, hold out long, and flee far End-ways; they covet to run against the Wind for coolness of the *Air*; and therefore those that *hunt* them, use to place the *Hounds* with the Wind. They are most easily taken in the *Woods*, the *Mountains*, and *Rocky Places* being their safest Holds. They are hardly known by their *Feet*, or *Fewmets*; being *hunted*, they take their first *Ring* large, and afterwards *hunt* the *Hounds*; that is, do often come back on the *Dogs*, and being almost down, or can hold out no longer, they take *Soil* and beat it like the *Hart*, keeping all their Body under Water, except their *Nose* to draw Air; nor will they stir thence, until disturbed by the *Huntsmen*, or the *Hounds*, coming just upon them. The *Crossings* and *Doublings* before the *Hounds* are termed *Trasenings*; and you must call him a *Fair*, and not a great *Roe-Buck*. The *Herd* is called a *Bevy*, of which Six is a small one, between Six and Ten a middle one, and Twelve a great *Bevy*. The *Roe*, as before noted, is seldom Fat, so that unless you find *Bevy-grease* on his *Tail* upon his breaking up, he is not *Venison*, and only fit for the *Hounds*.

The *Bowels*, *Blood*, and *Feet*; are the Reward due to the *Hounds*, and it is termed the *Dole*, and the dressing him is termed the *Herdlenge*.

As for the Hunting the *Roe*, I shall not give any further Instructions, it being not a *Chase* amongst us.

CHAP. IX.

Hunting the RAIN-DEER.

This *Country* produceth few or none of this sort, so that I shall have the less to say of *hunting* him.

He is like the *Hart*, though not so tall, and his *head* is fuller of *Antliers*, which are much bigger and wider in compass; he bears Twenty four *Branches*, or more, according to his *Age*, having a great *Palm* on the top, and his fore *Antliers* are also *Palmed*.

When he is *hunted* he flies End-ways, by reason of the heavy *Attire* on his *head*, which is his only defence, and chief ornament. He Feedeth like the *Hart*, and makes his *Fewmets* sometimes flat, sometimes round, and some say long. He is said to be long-lived, and when he is in his *Pride* of *Grease* is excellent *Venison*.

In those *Countreys* where they are common, they are seldom hunted at force, but taken with *Nets* and *Shot*, for being assailed by *Dogs* and *Men* unarm'd, he will endanger the killing or spoiling them; his custom being (that after he hath stood up a great while, doubled, crossed, and used what Subtilties he can to shun the *Dogs*) to betake himself to a *Tree* for his last refuge, and so planteth himself with his *Buttocks* against it, that nothing can assault him but just before, and hangeth down his *Head* to the ground, whereby all his *Body* is covered, until he find his advantage of ripping up the *Bellies* of his Pursuers, or otherwise spoiling them; seeming very dreadful to the *Hounds*, so that they will hardly venture on him.

For the finding out the *Rain-Deer*, you must use a *Bloodhound*, as before treated of.

CHAP. X.

Hunting the FOX.

Amongst the Divertisements used by the *Gentry* of this Kingdom, *Fox-hunting* is of no small esteem: What has been Wrote on this Subject, and what has likewise gone by Tradition, was that which was practised when the *Land* was much more Woody, and when they abounded so much to be a general Nusance, as *Wolves*, were (especially in the Mountainous parts) before they were destroyed; and, *Wales* was freed from them by an Imposition of *Skins*, to be paid to the Crown of *England*, which at large is taken notice of in our *British History*: But, *Foxes*, the Subject of this Discourse, being then less considerable for the mischief they did, were the less taken notice of; but the *Country People* receiving great Damages by their destruction of *Poultry*, *Rabbets*, *Lambs*, &c. on which they preyed, were not wanting in their endeavours to destroy them: And the ways by them then used (by what I can understand) was by a great Company of People, with *Dogs* of all kinds, assembled together, to go to such *Woods* and *Coverts* where they thought they were, and so to beset the place, whilst others went in to beat and force them out with some of the *Dogs*, and to be either Coursed by the rest of the *Dogs*, or taken in *Nets* or *Hays*, set on the out-sides for that purpose. But of late years (by Experience, the Mother of Invention) the knowledge of this (as indeed all other *Chases*) is arrived to far greater perfection, being now become a very healthful Recreation to such that delight therein; so that I shall in a brief and clear Method give you a Modern Account of *Fox-hunting*, as it is at this day used by the most Expert in this *Chase*.

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Although this *Chase* affords great Recreation, yet it is not so full of diversity as that of the *Hare*, for it leaves a hotter Scent, so that there are but few *Dogs* but will hunt the *Fox* with all imaginable cagerness; but as his *Scent* is hottest at hand, so it dies soonest.

The *Fox* doth not much trust to his Strength of *Body*, or swiftness of *Legs*, but endeavours to preserve himself by policy in *Coverts* and *Thickets*; and being hard run when he can stand up no longer before the *Hounds*, will draw toward those places where he useth to *Earth*, and then he makes his *Caves* his places of Defence; nor can he be got out, unless the Ground be soft; but generally his *Kennel* is betwixt the *Clifts* of *Rocks*, in Stony or Craggy places, or amongst the *Roots* of strong *Trees*, very deep, and of a difficult access, having commonly but one Hole for entrance, which goeth very deep before it comes to his *Kennel*. But he seldom takes the pains to make any, it being the work of the *Badger*, his business being but to find it out, and take up his Quarters therein, which he soon hath to himself; for his Stink is so offensive to the *Badger*, that he quits it, and makes another.

As to the Nature of the *Fox*, he is a Beast of great Subtilty, as well in his *Preying*, and places of Sanctuary, as in his *Chase*; to give you a particular account thereof, would be too tedious for this Discourse, nor are they unknown to most that use the *Chase*.

In many respects he is of the Nature of the *Wolf*. When a *Bitch-Fox* is *Bragged*, and with *Cub*, she is hardly to be taken; for then she lieth near the *Earth*, and upon hearing the least Noise, she betakes her self to her place of *Sanctuary*. When a *Bitch-Fox* goeth a *Clicketing*, seeking for a *Dog-Fox*, she crieth with a hollow Voice, not much unlike the howling of a *Mad-Dog*; And in the same manner she cries when she misses any of her *Cubs*; but when they are killed she crieth not, defending her self to the last Gasp. When she is *Salt*, her biting is Venemous. A *Fox* being pinched with Hunger, will prey on *Vermine* or *Carion*, for want of other Food; But his usual Food is *Poultery*, *Rabets*, and the like, being found a great Enemy to *Warrens* and *Henhouses*; and there be some that are so Crafty, as to lye lurking all day in *Ditches*, and under *Hedges* near *Houses*, to espy *Poultrey* for their prey at Night.

The *Fat* of a *Fox* is termed *Grease*, which is esteemed good for *Shrunk Sinews*, being Bathed therewith. The *Print* of his *Claws* on the Ground is called his *Footing*. That which for a *Hart* is termed *Harbouring*, for a *Fox* is termed *Kennelling*.

The *Fox* though esteemed by all the craftiest *Beast* that is, yet is taken several ways, as by *Hounds*, *Greyhounds*, *Nets*, and *Gins*: For the taking him with the two last, I shall Treat elsewhere, and with *Greyhounds* the Case is not often; so that my business will be only for the *Hounds* and *Terriers*, their Assistants, when he takes *Earth*, of which more anon.

The best Season to hunt the *Fox*, is in the Months of *November*, *December*, *January*, *Febrnary* and *March*; for before 'tis disadvantageous to the *Scent*, and the two first Months are the best, the Leaves then being rotten upon the *Ground*, which before obstruct the *Scent*; also the *Hounds* are best seen to *Hunt*, and the *Earthings* are sooner found; again in cold weather the *Hounds* hunt best, the *Fox* then having the strongest *Scent*, but it sooner dyeth than in a hotter Season. But *Frosty* and *Snowy Weather* are altogether unfit.

For the Hunting the *Fox*, the *Hounds* or *Beagles*, generally made use of, are such that have good Mettle, are stout and well Quartered. But they should differ according to the *Countrey* where they are hunted (as indeed in all other *Chases*); for those proper for the open *Champain Countries*, are the *Northern Hounds*, which are *Fleet* of *Foot*, and being thin Skinned, are not so proper for Thick *Coverts* and Bushy Enclosures, as the *Southern Hounds* which are Thick Skinn'd, and slow Footed, are not good for long Chases that the *Champain Countries* afford. Also the *Northern Hound*, and the *Southern Beagle*, makes a good strain for this Sport.

As to the Method now observed in hunting the *Fox*: Having found a *Foxes Earth*, about Midnight before you design to *Hunt*, the next Morning for preventing his *Earthing*, cause all his Holes to be stopt that you can find, except the main *Hole* or *Eye*, that is most beaten, which stop not until about Day-break, for fear of stoping him in; which done, let the *Huntsman* have all the *Dogs* in *Couples*, and being come to the *Wood* that you first design to try, first throw off your sure *Finders*, or *Staunch Hounds*, being such that will undertake no other *Scent*, but that of the *Fox* (for *Woods* and *Coverts* are full of change) and when one or more of them opens, 'tis a sure sign that he is upon the *Scent*, that is, where the *Fox* hath passed that Night; which is called a *Drag*, or *Trail*. If you find the rest of the *Hounds* that were cast off, to improve upon it, and that the Cry mends, 'tis most probable they are right; and as the *Drag* mends, cast off more that you can confide in. But if the *Scent* fails, then 'tis supposed they run it *Counter*, and in such Case they must be taken off; and try them the other way.

Upon the *Hounds* improving the *Scent*, whether the one way or the other; the *Huntsman* on *Foot* (that hath the charge of the coupled *Hounds*, and before that must have *Hardled* them, that is, with a *Slip*, for the purpose ready secured three or four Couple together, that they may not break in from him, to run into the Cry of the *Finders*) is called upon to throw in two or three Couple more of his *Stanchest Hounds*; during this while they are encouraged by the *Huntsman*, until they make it out to the place where the *Fox* is, which is called *Kennelled*, and is soon discovered by the *Hunsters* from the encrease of their Cry; then the most opportune time is watched, to throw off the major part of the *Coupled Hounds*.

The *Fox* when finding himself so hotly pursued, that he can't secure himself in those *Coverts* and *Places* he is acquainted with; and that when one great Slight faileth him, which is to hunt the *Hounds* just as they do him, whereby they are many

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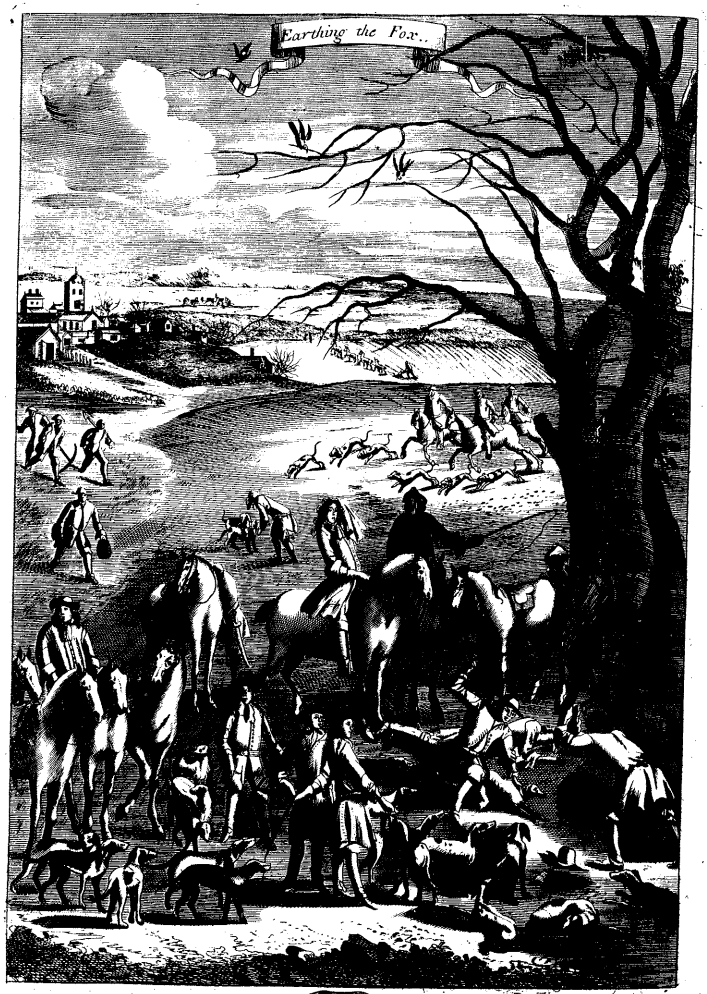

To the Worshipfull Sr Thomas Barnardiston
of Kediton in Suffolk Baronet;

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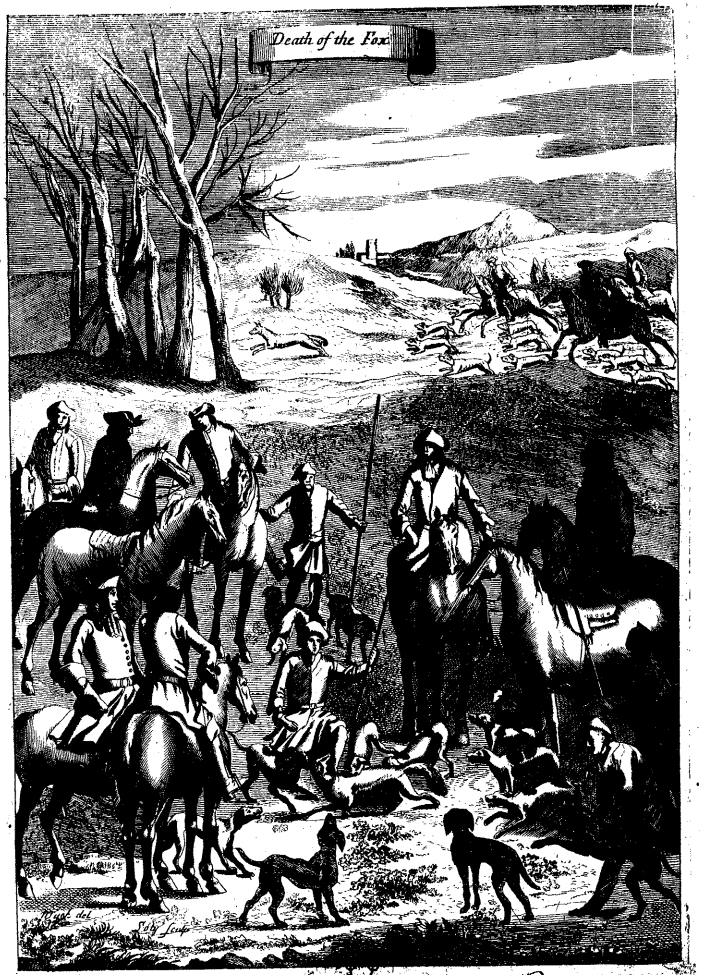

To the Worshipfull Alan Bellingham of Leaven in the County of Westmoreland Esq:

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many times at a loss, or great fault (which is chiefly prevented by their quartering of the *Hounds*) then is unwillingly forced to forsake them, and trust wholly to his Feet, leading them from *Wood* to *Wood*, a *Ring* of four, six, or ten Miles and sometimes endways about twenty miles, trying all the *Earths* he knows, which as near as possible should be stopt the Night before the *Hunting*, as aforesaid.

The *Huntsman* on *Foot* must cross (with what *Hounds* he hath in reserve) from *Wood* to *Wood*, to be as much as possible in the way, to throw them off when called upon, as an encouragement to the rest (they being Fresh) and at the same time must endeavour as much as he can, to encourage the *Finders* or *Staunch Hounds*, that begin to run lag, that as occasion may offer to have them ready for a dead Scent, or as is thought fit for the latter end of the Day.

Many times they kill the *Fox* upon the *Turf*; but if he gets to an *Earth*, and enters it, they cry *Ho-up*, as at the Death, supposing the *Chase* ended; and blow a *Horn* to call in the Company.

Earthing the FOX.

HAving *Earthed* the *Fox*, the next business is to get *Countrymen* with *Shovels*, *Spades*, *Mattocks*, *Pickaxes*, &c. to dig him out, if they think the *Earth* not too great; and for their facilitating the same, the *Huntsman* must be provided with one or two good *Terriers*, to put into the *Earth* after him, to lay him up; that is to fix him into an Angle, (which may be sooner done, according to the Opinion of some, by putting a Coller of *Bells* on the *Terriers* Neck) for the Earth oft times consists of divers *Angles*; and the use of the *Terrier* is to know where the *Fox* lyeth, for as soon as he finds him, he continues *Baying* or *Barking*; so that which way the Noise is heard, that way dig unto him; and when he is dug up, sometimes he is thrown amongst the *Hounds* to *Blood* and encourage them; and this will make them lye at an *Earth*, when they come to a strange *Wood*, and to an unknown *Earth*; and sometimes he is reserved alive, and hunted another Day, which is called a *Bag-Fox*.

The Death of the FOX.

FOr Rewarding your *Dogs*, when the *Fox* is killed, hollow in all the *Pack* to *Bay* him, but do not *Reward* them therewith, as being not good for them; but follow the former Directions for the Rewarding them.

If the *Earth* proves so Deep and Rocky, that there is no possibility of diging him out, usually *Steel-Traps* are set at the Mouth of the *Earth*, or else a *Hay* is pitched round it; and so watch to take him at his going off, which will be in the Night following, and oft times sooner; for his heat, and the coolness of the *Earth*, will not suffer him to stay in long: So that when he apprehends all things are quiet above, he comes out.

Of Terriers.

AS concerning *Terriers*, every one that is a *Fox-Hunter* is of Opinion, that he hath a good Breed; and some will say, that the *Terrier* is of a peculiar Species of it self; I shall not say any thing as to the Affirmative, or Negative part; only give me leave to say that such *Terriers* that are Bred out of a *Beagle* and a *Mungril Mastiff* generally prove good; and indeed any small thick Skinn'd *Dog* that hath Courage, and that will run into the Holes, and lye *Baying* at the *Fox*, is one for the purpose, which this sort will do, for he hath Courage, and a thick Skin, as participating of the *Cur*, and is Mouthed from the *Beagle*, as before taken notice of.

The *Season* for *Entring* these *Terriers* is at ten or twelve Months Old, for if you Enter them not within the year, you will hardly bring them to take *Earth*; neither must they be basted or over-mastered at first making, for then they will hardly return to it any more; Therefore be careful not to enter them upon old *Foxes*, or *Badgers*, but take such a time when they have their young, and are gone abroad to seek *Prey*. You must also encourage them, by putting in an old Staunch *Terrier* to lead the way, that if it happen that an old *Fox* should be there, he might be worried by him for their further Encouragement.

When *Foxes* have young *Cubs*, take an old *Terrier*, and put them into their *Earth*; and when they begin to *Bay* (which is called *Yearning*) hold the young *Terrier* at the Mouth of the *Earth*, to the end they may hear the old one *Yearn*.

If you take any young *Cub* with young *Terriers*, let them kill it; and take their pleasure thereon.

CHAP. XI.

Hunting the BADGER.

THere are two sorts of *Badgers*, *Dog-Badgers*, as resembling a *Dog* in his Feet; and a *Hog-Badger*, as resembling a *Hog* in his cloven *hoofs*; these latter differ from the former being whiter and bigger, and have their *Heads* and *Snouts* thicker, and do also differ in their Food; the one eating *Flesh* and *Carion* like a *Dog*, and the other *Roots* and Fruits like a *Hog*; And these sort of *Badgers* where they have their *Earths*, use to cast their *Fiants* or *Dung* in a small hole, and cover it, whereas the *Dog-Badgers* make their *Fiants* at a good distance from their *Burrows*, which are deep, with variety of *Chambers*, *Holes* and *Angles*. The *Hog-Badger* being fat and lazy, *Earths* in open, easy and light grounds, whereas the other sort frequents *Thickets*, *Rocks* and mountainous pla-

ces,

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ces, making their *Retreats* deeper and narrower.

A *Badger* is known by ſeveral other Names, as a *Gray*, a *Brock*, and a *Boreſon* or a *Bauſon*; the young ones are called *Pigs*, the *Male* is called the *Boar*, and the *Female* the *Sow*.

The *Badger* is naturally a very ſleepy Creature, and ſeldom ſtirs out but in the Night ſeaſon to ſeek his *Prey*; and above all other food *Hog-fleſh* is moſt grateful to his palate, in ſo much that if you take a peece of *Pork* and train it over the *Badgers Burrow* he will ſoon make his approach out: They live to a great Age, and when their ſight faileth by old age they keep to their Burrows, and receive their Food from the younger.

By nature they are very chill and cold, and when it ſnoweth they go not forth; Their *Fleſh* is of a ſweet rankiſh taſt, but is eaten in many *Countries*; the beſt ſeaſon is in *September*. They have very ſharp and venemous *Teeth*; their *Legs* are longer on their right ſide than on their left, ſo that when they run they chooſe a ſide of a *Hill*, *Bank*, *Furrow*, or *Cartroot*.

The *Dog-Badgers Ears*, *Snout*, and *Throat* are yellowiſh, and are longer Legged than the *Hog-Badger*. They accompany not together yet they both prey on all manner of *Fowl*, young *Pigs*, *Rabets* and the like food, doing great hurt in *Warrens*. They are ſtout and hardy in defending themſelves, and will endure good blows, yet their *Noſe* and *Snout* is ſo tender that a little blow thereon will kill them.

Although the *Badger* and the *Fox* are much alike in ſeveral qualities, yet do they often make War with one another, eſpecially on the Account of *Food*, ſo that it is good ſport to ſee the conteſt betwixt them. The hunting and purſuing them however is much at one towards the concluſion, for the *Badger* runs to his *Earth* or *Burrow* much ſooner than the *Fox*, and being Earthed maks good and defends his *Caſtle* much longer, and to ſay truth, the pleaſure of this *Chaſe* doth chiefly conſiſt in the *Unkennelling* and *Unearthing* of them, which requires skill and labour.

You are to take notice, that although all *Hounds* will eagerly purſue and hunt both the *Fox* and *Badger*, yet there is none of them that will endure to feed on their fleſh; and there are ſome *Dogs* more proper for this Chaſe than others, and thoſe are the *Terriers* already ſpoken of in the Chapter of *Fox Hunting*.

The labour and ingenuity of the *Badgers* in making their *Burrows* is worth obſervation; when they *Earth*, after they have entred a good depth, for the clearing the Earth out, one lieth on his *Back*, and another layeth Earth on his *Belly*, and ſo taking his hinder *Feet* in his mouth draweth him out of the *Burrow*, and having unladen himſelf of the Earth goeth to the ſame work, and this they do till their *Chambers* or places of *Retreat* are finiſhed; then they proceed to gather in their Furniture, that is, the materials for their *Couch* or *Lodging*, as *Straw*, *Leaves*, *Moſs* and the like, which with their *Feet* and *Head* they wrap up ſo cloſe together, that they will get to their *Burrows* a pretty good Bundle, ſome *Burrows* have 7 or 8 diſtinct *Chambers*.

In hunting the *Badger* you muſt ſeek the *Earths*, and *Burrows* where he lieth, and in a clear Moonſhine Night go and ſtop all the *Burrows* except one or two, and therein place ſome Sacks faſtned with drawing ſtrings, which may ſhut him in as ſoon as he ſtraineth the *Bag*. Some uſe no more than to ſet a *Hoop* in the mouth of the *Sack*, and ſo put it into the Hole, and as ſoon as the *Badger* is in the *Sack* and ſtraineth it, the Sack ſlippeth off the *Hoop* and follows him into the Earth, ſo he lieth tumbling therein till he is taken. Theſe *Sacks* or *Bags* being thus ſet, caſt off the *Hounds*, beating about all the *Woods*, *Coppices*, *Hedges* and *Tufts* round about for the compaſs of a *Mile* or two, and what *Badgers* are abroad, being alarmed by the *Hounds*, will ſoon betake themſelves to their *Burrows*; and obſerve that he that is placed to watch the *Sacks*, muſt ſtand cloſe and upon a clear wind; otherwiſe the *Badger* will diſcover him, and will immediately fly ſome other way into his *Burrow*. But if the *Hounds* can encounter him before he can take his Sanctuary, he will then ſtand at *Bay* like a *Boar*, and make good ſport, grievouſly biting and clawing the *Dogs*, for the manner of their fighting is on their *Backs* uſing both *Teeth* and *Nayls*, and by blowing up their skins defend themſeves againſt all *Bites* of the *Dogs*, and Blows of *Men*, except on their *Noſes*, as aforeſaid. And for the better preſervation of your *Dogs* 'tis good to put broad *Collers* about their Necks made of *Grays Skins*.

When the *Badger* perceiveth the *Terriers* begin to *Tearn* him in his *Burrow*, he will ſtop the Hole betwixt him and the *Terriers*, and if they ſtill continue *Baying*, he will remove his *Couch* into another *Chamber* or part of the *Burrow*, and ſo from one to another, Barricading the way before them as they retreat, until they can go no further.

If you intend to dig the *Badger* out of his *Burrow*, you muſt be provided with thoſe *Tools* already treated of for the diging out the *Fox*; beſides which you ſhould have a Pail of water to refreſh the *Terriers* when they come out of the Earth to take breath and cool themſelves; It will alſo be neceſſary to put about your *Terriers* Necks *Collers* of *Bells*, which making a noiſe, may occaſion the *Badgers* bolting out.

Theſe *Tools* thus uſed for the diging out of the *Badger*, being troubleſome to be carried on *Mens Backs*, may be brought in a ſmall *Cart*.

In diging you muſt conſider the ſituation of the ground, by which you may judge where the chief *Angles* are; for elſe in ſtead of advancing the work you will hinder it.

In this order you may beſiege them in their ſtrongeſt *Holds* or *Caſtles*, and may break their *Plot forms*, *Parapets*, *Caſmats*, and work to them with *Mines*, and *Counter-Mines*, until you have overcome them.

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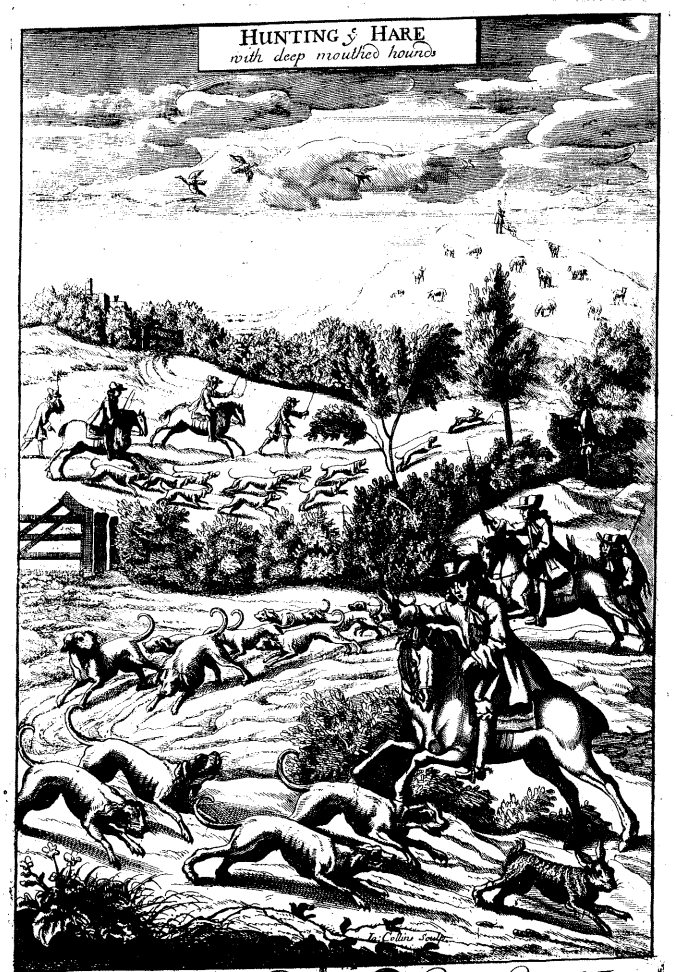

To ye Rt. Hon.ble John Lord Viscount Bodmyn Earle President of his Ma.ties most Honourable Privy Councell. This Plate is humbly dedicated by Richard Blome

Having taken a live and lusty *Badger*, if you would make sport, carry him home in a *Sack* and turn him out in your *Court-yard*, or some other enclosed place, and there let him be hunted, and worried to Death by your *Hounds*.

I shall conclude this *Chapter* with some short Account of the profits and advantages that accrew by killing this Creature; Their *Flesh*, *Blood* and *Grease*, though not good *Food*, yet is very useful for *Physitians* and *Apothecaries* for *Oyls*, *Oyntments*, *Salves*, and *Powders*; for *shortness* of *Breath*, the *Cough* of the *Lungs*; for the *Stone*, *Sprained-Sinews*, cold *Aches*, &c. and the *Skin* being well dresst, is very warm and good for Ancient people that are troubled with *Paralitick Distempers*.

CHAP. XII.

Hunting the HARE.

THis *Chase* affords Delight and Recreation to every Man; for none but Persons of *Estate* and *Quality* have the Priviledges and Conveniences of *Forests*, *Chases*, and *Parks*; but Men of a lower Rank may sometimes divert themselves with the *Hare*.

Now although *Hares* are common, and that the *hunting* them is every mans Sport; yet doth it not cease to be an Art full of Subtilty and Craft, requiring labour and vigilance to carry it on to the designed purpose or end; nor is it without divers delights and varieties, that other *Chases* do not afford.

There are said to be Four sorts of *Hares*, so termed according to the places of their abode; *viz.* Some live in the *Mountains*, some have their habitation in *Coverts* and *Fields*, others in *Marshes* and *Moorish Grounds*, and others are Ramblers, as having no constant abode, seeking their *food* where they can find it best and securest.

Those of the *Mountains* are the most swift of Foot, and that by their often exercising themselves in the *Valleys* and *Plains*; so that when they are hunted in the *Fields* or *Valleys* such is their craft, as well knowing the neareſt ways to their *Forms* or places of Abode, that they will fool the *Huntsmen* by seeming almost taken; but on a sudden will give them the Go-by, and take the neareſt way to the *Mountains* and inaccessible places, where neither *Dogs* nor *Horses* can ascend.

Those *Hares* that frequent the *Fields* and *Coppices*, being often chased, are lean of Body, and taken with difficulty; when she begins her Course, she leapeth up from the Ground as if she flew, afterwards passeth through all places, and that with great swiftness, yet not so much as to spend her strength without hotly pursued; for she is observed to take her Measures from her Prosecutors, well knowing that she can out-run the *Dogs* at pleasure. When she is some distance from them, she usually gets to some little *Hill*, or Rising-ground, raising her self on her Hinder-feet to espy the *Dogs*, thereby the better to avoid them.

Those *Hares* that frequent *Marshy* or *Moorish places*, are the slowest on *foot*, and least able to endure labour; and being *hunted*, will seldom or never use *High-ways*, or *Beaten-paths*, but use their Slights and Subtilties by the sides of *Rivers* and Watery places; nor are they able to run long before the *Hounds* for want of Breath, as being so Fat and Foggy through their gross *food*.

The younger *Hares*, by reason of their weak Members, tread heavier than the elder, and therefore leave the stronger Scent behind them. They run very swift at a Year old, and their *Scent* is stronger in the *Woods*, than in the plain *Fields*.

In the Winter Season their Foot-steps are more apparent than in the Summer; for as the Nights grow longer, so they Travel further; neither do they *Scent* in the Winter Mornings, until the *Frost* is somewhat thawed; likewise their Foot-steps are uncertain at the Full of the *Moon*, for then they play together.

Every Limb of a *Hare* is made for celerity, and therefore she never travelleth, but jumpeth; her *Ears* lead her the way in her *Chase*, for with one of them she hearkneth to the Cry of the *Dogs*, and the other she stretcheth forth like a Sail, to hasten her Course.

In the *hunting* the *Hare*, you are principally to observe the Season of the *Year*, and the Situation of the *Ground* where you *hunt*. In the beginning of the Year, that is, about *September*, (for then the Year begins as to this Sport) *Hares* repair to *Shrubs*, *Bushes*, and the like Shelters, that are near adjoyning to some *Coppice*, or the like. About *December* in *Fallow-Grounds*; and in *March* in the Green *Winter-Corn*. In every of these places, or wherever else you find the *Form* of a *Hare*, observe if it be new or old, and order your self accordingly. If it be smooth and plain within, the *Path* before it new and warm, so that you may discern the Pricks and perceive the Earth to be late broken, and that the *Hounds* call merrily on it, then endeavour to recover the *Hare* upon the *Trail*, and with good success. But if you find reason to judge it an old *Form*, proceed not on it, though the *Dogs* call on it, but rate them back, for it will be lost labour.

Hares are very Melancholy, and consequently very Fearful and Crafty, insomuch that when they go out of their *Form*, they endeavour the most they can to get dry and clean into it, to the end they may rest warm; and in that they partake of the nature of the *Cat*, that loves *Fish*, but hates *Water*; yet some *Hares*, being close hunted, will take the Water, crossing and doubling about twenty times over and over in about the space of half a *Mile*.

They are distinguished by the names of *Bucks* and *Does*, and some call the Males *Jack Hares*. They go to Buck in *January*, *February* and *March*, and sometimes in all the warm Months.

An expert *Huntsman* may distinguish *Hares*, as to their *Sex*, *Strength*, *Age* and *Craftiness*, by these and other signs. If when a *Hare* riseth

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out of her *Form*, she sets up her *Ears*, and runs a little slowly at first, with her *Skut* cast over her *Back*, 'tis a sure sign she is an old crafty beaten *Hare*. When you hunt a *Hare* to her *Form*, if you find she hath beaten the hard *High-ways*, that she feedeth at a good distance out into the *Plains*, and that her *Doublings* and *Crossing*; are wide and large, you may conclude 'tis a *Jack Hare*; for the *Females* usually keep close to the side of some *Grove* or *Coppice*, and turn and wind like a *Coney* in the *Bushes*; and when she goeth to *Relief* in the *Corn-fields*, doth seldom cross over the *Furrows*, but follow them, feeding on the thick *Tufts* of *Corn*; and when she is hunted, will use many *Doublings* and *Turnings*, but seldom makes out End-ways, or Fore-right.

But the *Jacks*, after two or three Turns about his *Form* takes his leave, and gives the *Hounds* a breathing of four or five Miles, and sometimes more before they can turn his *Head*, and then will squat in some place where ('tis probably) he hath formerly preserved himself. You may also know a *Jack Hare* at his rising out of his *Form* by his Hinder parts, which are more whitish; also his *Head* is shorter, and better trussed; his *Ears* are shorter and more gray; his *Shoulders* are redder, and the *Hair* on his *Lips* are longer than the *Females*; for the *Doe* hath her *Ears* long, her *Head* long and strait, the *Hair* on her *Back* of a dark Gray, inclining to a Black, and is larger in Body than the *Buck*. The *Croteys*, or *Excrements* of a *Buck*, are lesser, dryer and sharper at the end, than the *Does*.

The *Hare* is said to know the change of the Weather, from twenty four hours to twenty four. Some *Hares* by haunting the low Watery places, do become *foul* and *measled*; and such *Hares* do never follow the hard Ways, nor make such *paths* to their *Forms*, but use all their Subtilties by the sides of *Rivers*, and other *Waters*. And by the way you must know, that the *Females* are not so commonly foul and measled as the *Males*; so that a *Huntsman* may judge by the *relief* and *feed* of the *Hare* what she is, and which way she *formeth*. A *Jack Hare* will abide the approach of the *Hounds* nearer him, when he sitteth, than the *Female*; because he feeleth his Body better disposed, more hardy and quicker.

The *Huntsman*, when he perceives by his *Hounds* that the *Hare* hath passed by him at *Relief*, upon the *High-ways* side, and that she hath *crossed* and *doubled* much on dry places, and yet not much broken out, nor *Relieved* in the *Corn*; he may be confident, that it is a Passenger or Stranger in those parts: The nature and use of such *Hares* is this; They get them to some high Rising-ground, and take a view where they may secure themselves; and when perchance they are started out of their *Form* they double, winding about to their *Forms*, as unwilling to forsake them; but when they find the *Hounds* hold in with them, then they may chance to lead them a Dance of seven or eight Miles cross the *Countrey*.

The Subtilties of the Hare, *when she is hunted.*

OF all *Chases*, the *Hare* makes the best diversion, and sheweth the most cuning in *hunting*, and is of greatest use, for that they may be found at all times, and *hunted* in most Seasons of the year with a small charge; and to add to the pleasure of this *Chase*, the *Game* is usually in sight (especially if hunted with your *Fleet* or *Northern Hounds*) so that her Subtilties and cuning Shifts to avoid the *Hounds*, are for the most part seen. I shall here take notice of some of them.

If a *Hare* chance to run before a Pack of *Hounds*, either in, or presently after any *Rain*, she will hardly take into the *Woods*; by reason of the *Dew* and *Wet* that hangs on the small low *Boughs*, but will often squat under a *Hedge-side*; and when the *Dogs* have over-shot her, will return to her *Form*. To prevent which, the *Huntsman* ought to hang back a good distance from the *Wood* or *Grove*, which she seemeth to enter, to the intent he may hallow off his *Dogs* before the *Hare* be too far gone.

Whosoever hath hunted one and the same *Hare* twice, and doth not kill her the third time, deserves not the name of an *Huntsman*; for generally they use the same *flights*, *doublings*, and *crossings*, so that they may easily be prevented in any one, which defeats them of all the rest: And if it be *Rainy-weather*, she will hold the *High-ways* more than at any other time.

The *Huntsman* must mark in what place the *Hare* sitteth, and upon what Wind she makes her *Form*; for if either upon the *North* or *South-Wind*, she will not willingly run into the Wind, but upon a Side-wind, or else down the Wind. Also if a *Hare Forms* on the Water-side, 'tis a sign she is foul and measled; therefore in hunting such a *Hare*, good care must be taken all the day unto the *Brook-sides*, for at such places she will make all her *Doublings* and *Crossings*. Some again will swim over great *Pools* and *Rivers*; others will put an exchange upon you, by starting up a fresh *Hare* out of her *Form*, and sit in it her self: Sometimes they will double twenty or thirty times in about forty *Tards* forwards and backwards over a *Brook*; and sometimes they will rest themselves in the midst of the Water upon *Weeds*, or *Bulrushes*. A *Huntsman* must likewise observe whether it be a *Buck* or a *Doe*, and whether she be acquainted with the place, or a Stranger; for doubtless a *Hare* that is wonted to a certain place, especially a *Female*, will all the day that she is *hunted* hold the same ways, cast about the same *Coasts*, and pass by the same *Muses* until her death, or escape; unless she be hard run, so that she is forced to make out End-ways before the *Hounds*; but at first she will do nothing but *Turn*, *Cross*, and *Double*, passing several times one way, and in the same *Path*. Some *Hares* are so cuning, that upon hearing the noise of the *Huntsmans Horn* (although at a good distance) will leave their

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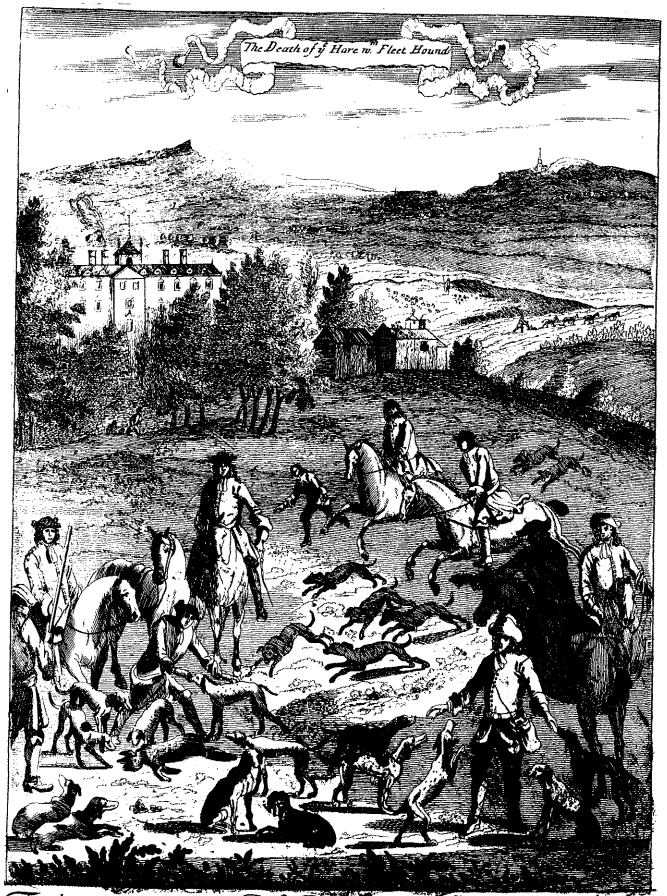

To the Right Worshipfull S.r Robert Dashwood
of Norbrook and Wickham in Oxford shire K.t

This Plate is humbly dedicated by Richard Blome.

their *Form*, and take *Sanctuary* on som *Weeds* or *Bulrushes* in a *River*. Sometimes when they are hard *hunted* they will go to *Vault*, that is, take the ground like a *Coney*; others, if an opportunity offers, will go up one side of a *Hedge*, and come down the other side; and some will run on the very top of a close *Hedge*, about an hundred *Yards* together; also some are said to be so subtile as to get into the *Windows* of an old decayed *House*, for shelter from the *Hounds*: Sometimes being hard hunted they will run into a *Flock* of *Sheep*, and will continue in the midst of them like unto the *Fox*. Sometimes she will leap, and make heading; otherwhiles will tread softly, to leave the less Impression behind her; and sometimes she will lye down, and ever and anon leap, or jump out and into her *Form*; all which doth much perplex the *Dogs* to find her *Scent*: For all which Causes, it is good to help the *Hounds* as much as possible with *Voice*, *Horn*, and *Hawt*. To conclude, They use many Subtilties and Shifts to preserve their poor lives; so that the *Huntsman* had need be very circumspect and industrious, otherwise he may soon spoil his *Dogs*; for as in all *Chases* the *Hare* makes the greatest diversion, so it is a great delight to see the many *Stratagems* they have to save their lives.

For a *Hound* that is a perfect *Haryer*, may be bold to *hunt* any Chase; but the *Hare* of all *Games* leaves the least *Scent* behind her; but when once your *Dogs* have been accustomed to the *Stag* or *Buck*, 'tis not easie to bring them in love with the *Hare* again.

When *Hares* feed on *Green Corn* they have the greatest *Scent*, and are then more eagerly pursued by the *Hounds*; and there are some that naturally give a greater *Scent* than others, as the great *Wood Hares*, and such as keep the *Marshes* and *moist Grounds*, being *foul* and *measled*.

Young *Hares* that have not been hunted are foolish, not using the *Crafts*, *Subtilties*, *Doublings*, and *Crossings*, as Old ones do; but hold on End-ways before the *Hounds*, often *squatting* and *starting*, which doth much encourage the young *Hounds* at their first *Entring*.

The *Females* are observed to be more crafty than the *Males*, making their *Doublings* and *Turnings* shorter, which is no ways pleasing to the *Hounds*, who delight more at an End-way *Chase*; for such *Hares* that *cross* and *double* so often, 'tis necessary at default to cast the greater compass about when you beat to make it out; by which means you will find out all her Subtilties, and you need not stick upon any of them, but where she went on forwards; and thereby you will abate her force, and compel her to leave her *Doublings* and *Crossings*.

How to Enter young Hounds to the Hare.

FOr Entring young *Hounds*, be they *Northern* or *Southern Hounds*, or *Beagles*, two or three *Huntsmen* is sufficient; of which let one serve to rate and beat on such *Hounds* as keep plodding behind, and the other two may be employed to make the *Hounds* seek and cast about; for if there be many *Huntsmen*, they will foyl the Traces and Footings of the *Hare*, or at least-wise amaze the *Hounds* with their several *Voices*, when they are at default; whereas they should receive assistance at such time from them by encouragement, or otherwise; for above all things 'tis necessary, that the *Hounds* know their *Masters* or *Huntsmans Voice*, and his *Horn*, for then when it cometh to the *hallow*, they will sooner come in to his *Voice* than to any others; therefore he must never *hallow* them without good cause; and it were not amiss, if he gave them a bit or two of *Bread* when they come in, for their encouragement.

It is not good to Enter your young *Hounds* in the *Mornings*, because of the *Dew* and *Moisture* of the Earth, for then when you bring them to hunt in the *heat* of the Day, especially in hot Weather, or at some time when the *Wind* hath dryed up the Moisture of the Earth, they will neither *hunt*, nor *Call on* merrily, but will run to the shady places to rest and sleep; therefore the best time to enter young *Hounds* is in the Heat of the Day, and about *October* and *November*, the Weather being then temperate, and young *Hares* that have not been hunted are then foolish and easier to be taken, which doth much encourage them.

It is observed, that a *Hare* hath greater *Scent*, and is more easily hunted by the *Hounds* when she feedeth upon *green Corn*, as aforesaid, than at any other time of the Year; and yet also you have some *Hares* which are naturally stronger *Scented* than others, and are much more eagerly hunted by the *Hounds*, and such are those great *Wood Hares*, and such as keep in *Marshy*, *Watery Grounds*, being foul and measled; but the little red *Hare* is neither of so strong a *Scent*, nor is so eagerly hunted by the *Hounds*.

Also remember, that at the Entring your young *Hounds*, you never help them to kill the *Hare* with your *Greyhounds*; for if you accustom them to have *Greyhounds* to Course before them, they will never take pains, nor put their *Noses* to the Ground, nor beat about or hunt for the Scent of the *Hare*; but the best Entring them is with old *Staunch Hounds*, that understand how to make out a default, and that have good *Noses* for the *Scent*.

The best Season of the Year for hunting the Hare, with Directions how to seek her, start her, and hunt her.

THe *Season* for *hunting* the *Hare*, is from *September* to the beginning of *April*; for afterwards the sweet *Herbs* and *Flowers* that grow about, as also the heat takes away the *Scent*, together with this, that during the *Summer* they breed their *Leverets* and are feeble and weak; but the best Season to enter your young *Dogs* is at the first hand of the year before they are great and strong.

Your

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Your *Hounds* after two years old, may be exercised three times a Week, for which they will be better, provided they Feed well, and keep them out the greatest part of the day, to try their Stoutness, and to make them bold.

It is observed that a *Hare* leaveth a better *Scent* when she goeth to *Rel ef*, than when she cometh from her *Form*, by reason that when she feedeth, she coucheth low, and passeth oft times over one plot to seek good Feeding, and thus leaveth a better *Scent*; for when she goeth to her *Form*, she commonly takes the *Highways*, *doubling* and *Crossing*, as lightly as she can; and yet she will oft times *Squat* by the sides of *Highways*. Now having found where a *Hare* hath *Relieved*, the Season of the *Year* and the *Weather* must be considered; for if it be *Spring*, or *Summer*, a *Hare* will not sit in the *Bushes*, but in *Corn-Fields* and open places, whereas in Winter they delight to sit near *Towns* and *Villages*, in *Brambles*, and Tufts of *Thorns*, especially when the Wind is Southernly or Northernly.

According to the Season and Nature of the place where the *Hare* is accustomed to sit, there beat with your *Hounds* to start her, which is much better sport than Trailing of her from her *Relief* to her *Form*; and having hollowed in your *Hounds*, and all of them in full Cry, then *Recheat* to them with your *Horn*, following fair and softly at first, for fear of their over-shooting the Chase through too much Heat; but after about an hours Course, you may come in nearer with the *Dogs*: And above all things, be sure to observe well her first *Doublings*, which must be your Directions for the whole Days Chase; and if the *Hounds* fall at Default, 'tis a sign that the *Hare* hath made some *Doublings*, or *Crossings*, or that she hath gone and come back again the same way, in such case do not over-shoot it, but make a stay, and let the *Hounds* beat about to find the Scent in the fresh green places, and forget not to *Reward* the *Hounds* and to encourage them.

And if you chance to find an old *Form*, let the *Huntsman* be provided with a piece of *Bacon*, and therewith anoint the end of his *Hunting-Pole*, and whensoever he would point his *Hounds* to a *Muse*, or to any place, let him but strike his *Pole* on the Ground, and the *Hounds* will go through the *Muse*, or come into any place where he shall point them, and hunt it much better. But if the *Huntsman* when he hath cast about, find that the *Hare* is gone out beyond the compass he casteth, then let him call back his *Hounds* to the place where they first came at *Default*, and there beat with the *Hounds*, still outwards on both sides of the way; for oft times the *Hare* followeth the *High-ways* very far to *Double*, *Cross*, and use her *Policies*, and will not go out of the way for about a Mile together; and in such places the *Hounds* can have no *Scent*, by reason of the *Dust*, and other *Impediments*; and yet they will *Squat* upon, or near the out-sides of the ways; and therefore let the *Huntsman* beat the sides of the ways very well.

There are some *Lands* in which a *Dog* can never make any *Scent*, and such are those that are of a low, fat, glutinous, and greasy shining Mould, and those give more *Scent* than they receive; therefore the *Huntsman* must help out the *Dogs* by pricking, for generally those *Soils* are moist, and apt to receive impressions. In *Plains* and *Downs* there is very short *Grass*, and few or no *Shrubs* or *Bushes*; so that the *Scent* dryeth immediately, and in such places the *Eye* must help the *Nose*.

Beware how to hunt in *Frosty weather*, for then *Hares* run best, and *Dogs* worst; for the *Hare* hath his *Feet* furred, as it were for the same purpose; but the *Dogs* are all bear, and besides the cutting or bruising their *Feet*, doth endanger the losing their *Claws*, and consequently the spoiling the *Dogs*. Likewise in *Frosty weather* the *Scent* freezeth with the *Earth*, so that there is no certainty until it thaw, or that the *Sun* shineth to soften the *Earth*. It is likewise found not good to *hunt* if it *Rains*, for the drops disperse the *Scent* of the *Hare*, so that it is best to leave off until it be fair. Likewise the *Summer Season* is not good to *hunt* in, for the heat loseth the *Scent*; and the Nights being but short, the *Hare* goeth not far, and only Feedeth in the *Evenings* and *Mornings*.

Some are of Opinion, that according to the places where you first Enter your young *Hounds*, and the Nature of the *Quarry* given them, they will accordingly prove for the future; as if Entred in the plain Champain *Countries*, they will always take greater delight to hunt there, than in *Coverts*, *Mountains*, *Marshy Grounds* or the like places; therefore it is good to use them to all sorts of Grounds, it being ease to bring them to enjoy a *Scent*, from a *Bleak Down* to a *fresh Pasture*, for good *Hounds* will soon be *Masters* of any sort of Ground.

It is an old saying and a true, The more *Hares* you hunt, the more you may; for when once a *Jack* and a *Doe* have accompanied together in any place for some time, they will not permit any other *Hare* to frequent or use their Territories, but force them away, except their own young; nor will they permit them to stay long after they are able to shift for themselves, so that the more you kill, the more room you make for fresh ones.

There is great exactness required in the first Entring your young *Hounds*, never use to uncouple them in the same kind of Ground; for if you uncouple them three or four times at first in a plain Field, and so hunt to the *Form*, they will not know what to do, when you turn them loose in a *Covert*, but let them have diversity of *Hunting*, that so they may be perfect at all. But to return to the *Hare*: When any *Hound* hath accidentally found the Trail of a *Hare*, where she hath relieved that Night, the *Huntsman* must not be too hasty to encourage him, until he hath found her out.

The *Huntsman* ought to observe how the *Winds* are, for when North or East, the *Hares* will be sure to keep close in the *Bushes*, *Tufts*, *Brambles*, and the like places; especially in the *Winter*; but in *Summer* the *Snakes*, and such like things that frequent such places do anoy them, so that they make use of *Corn-Fields*, and other places.

There

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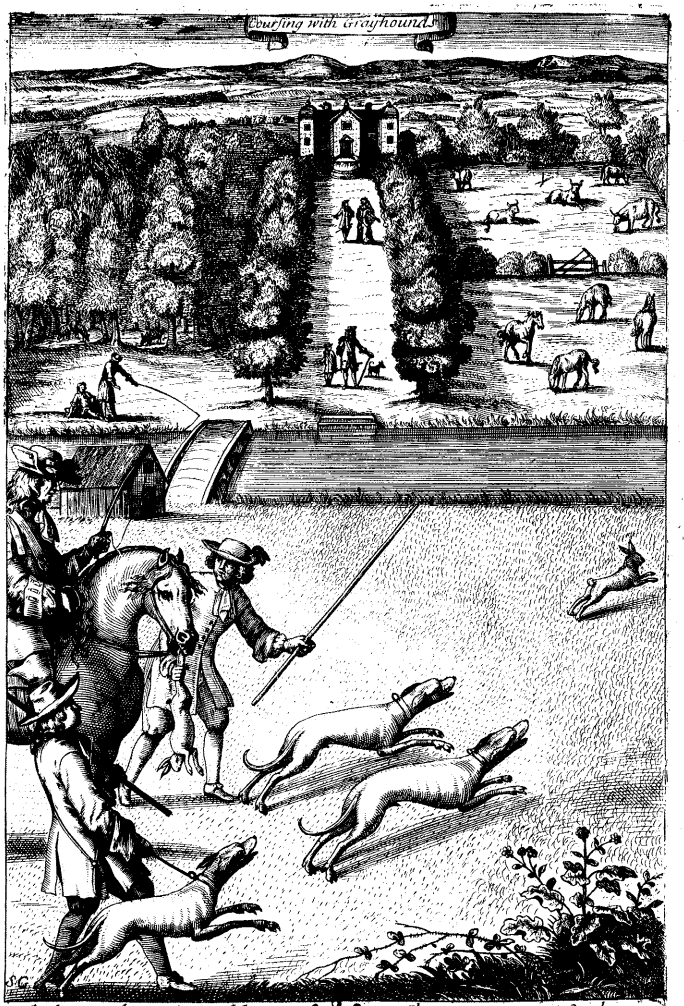

To the Right Honourable Rivers, Viscount Colchester Darcy and Baron of This Plate is humbly

Thomas Savage, Earle and Rock Savage, Lord Chich &c.d

Dedicated by Richard Blome.

There are some that in *Hunting* never hollow before the *Hare*, neither help the *Hounds* by *Pricking*, or *Laying* them on in full fresh *Scent*, or the like, neither assist them at a default, but suffer them to work it out of themselves: This is confessed to be a sure way to try the goodness of your *Hounds*, but 'tis tedious and laborious; others there are that take all the advantages they can to help them, by marking which way the *Hare* bendeth at first, and then they will Coast before to meet her; and at every default help them out, and this is esteemed a ready way to kill all they meet with.

How to Reward the Hounds when they have killed the Hare.

When your *Hounds* have killed the *Hare*, and that you intend to give over the sport for that time, let the *Huntsman* if on Horse back alight, and blow the Death with his *Horn*, to call in the Company; then let him lay down the *Hare* in some clean place, upon the Grass or the like, and let the *Hounds Bay* about it, but suffer them not to touch it; and let them be encouraged, and made much of, claping and stroaking them on the sides, shewing them the *Hare*. Then take up the *Hare*, and hulk her, and strip off her skin before the *Hounds*; and being thus ordered, and the *Gall* and *Lights* taken away, which will make them sick, proceed to Reward them after this manner; The *Huntsman* must be provided in his *Wallet* with Bread cut in small pieces, and dipt in the *Blood*; which distribute to the *Hounds*, together with the *Inwards*, except the *Lights*; and sometimes the whole *Hare* except the *Lights*, if you are provided with a *Brace* or *Leese*; and if there are any young *Hound* that is fearful to come in among the rest, give him the *Hares* Head by himself, which will much embolden him; but fail not to give your *Hounds* Bread after it, to prevent Sickness; for 'tis a meat wherein they delight not by Nature, and the Antipathy between them is improved by *Art*, for you must understand that the Flesh of a *Hare* will make a *Dog* Heartsick, and cause him to vomit; but it is otherwise with the Flesh of a *Stag*, or any other *Deer*, for that agrees very well with them; and to say truth, the Flesh of a *Hare* is not very good for Man, being dry, and hard of Digestion, breeding Melancholy Blood; but *Leverets* or young *Hares* are good and nourishing.

There are some parts of the *Hare* that are found good *Medicines* for some Diseases; for Instance, The *Brains* are good for young *Children* in Breeding *Teeth*, the Flesh well roasted is good for *Fluxes* of the Belly. For stopping of the *Urine*, take a *Hares Skin* being made clean; and put it whole into an *Earthen pot* pasted over on the top; and let it stand in two or three hot Ovens, until you find it parched to Powder, of which take an Ounce, and mix it with *Rhenish* or *Whitewine*, and drink it every Morning fasting two hours after; and in a short time it is said to break the Stone both in the *Urin* and *Bladder*; but the Body must first be prepared with some gentle *Purge*; and whilst you use it, keep plates of Lead on the Patients *Reyns* about four Fingers broad, sowed between two or three Linnen Cloths; the *Gall* is said to be for good Eyes that are *Filme grown*. 'Tis said that their *Dung* hinders a Womans conception; but though this can't be confirmed for truth, yet this may be said, that it being made into a *Suppositorie*, and put up the *Matrix*, restrains the too immoderate Defluxion of the *Courses*, and dries up the moist Humours, and slipperiness of those parts. The *Blood* is a great Dryer, and very good to kill all *Tetters*, *Ringworms*, *Scabs*, *Morphews*, &c. and makes the Skin smooth and white; and the downy *Fur* or *Wool*, being burnt to Powder, is very good to stop Bleeding.

Warreners have a very crafty way to Fatten *Hares*, which is to stop their *Ears* with Wax, to the end they may not hear Noise, for being freed from the fear of sound for want of hearing, they soon become Fat.

CHAP. XIII.

Of GREYHOUNDS, and Coursing with them.

The *Greyhound* of all *Dogs* is for Swiftness of Foot, and neatness of *Shape* to be preferred before all others.

In choosing a *Whelp*, that which weigheth lightest, generally proves the best and nimblest; also those that are raw-boned, lean, loose made, and for the most part unlike in every *Joynt*, do make excellent and well-shaped *Dogs*; whereas those that after three or four Months appear round, close, trust, fat, and well knit in every part are scarce worth the rearing, seldom proving good, swift or comly, and it is observed that the *Bitches* are commonly more swift and nimble than the *Dogs*.

At two *Years* old your *Greyhound* will be at his full growth, and for the choosing one of an excellent Shape, he should have a fine thin *Skin*, with soft thin Hair, a long, lean *Head*, with a sharp *Nose*, from the Eyes downwards; a full clear *Eye*, with large *Eye-lids*, little *Ears*, a long *Neck* bending like a *Drake*, with a loose hanging *Weezand*, broad *Breasted*, his *Body* indifferent long, and reasonable great, with a *Back* streight and Square, having a rising in the middle, a small *Belly*, broad *Shoulders*, round *Ribs*, with a long space between his *Hips*, a strong *Stern*, a round *Foot* with large *Clefts*, and his *Fore-legs* streit and shorter than his hinder.

How to Breed, and order Greyhounds to the best Advantage.

Be sure to Breed on a right tryed *Bitch*; for an indifferent *Dog*, may get on such a *Bitch* very good *Whelps*: But the best and surest way is to have both the *Dog* and *Bitch* good, and then there will be no fear of your *Whelps* proving

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excellent; and to be exact, both *Dog* and *Bitch* should be of an equal Age, and not exceeding four years, but the *Bitch* will breed much longer, so that a young *Dog Line* her.

But although a *Gerybound* have all the aforesaid good shapes in perfection, and be also excellent in his kind, yet through disorderly keeping he may be spoyled: You must therfore understand the Art both of well feeding, and right *entring* him.

How to feed and order Greyhounds.

Your *feeding* and *dieting* a *Greyhound* doth not altogether consist in the *meat* you give him, but also in his *exercise*, *airing*, and *kennelling*; If he be in a *full state* the *chippings* of *Bread*, or *crust* steeped in fresh *Broth* is very good; the like is *Milk* and *Bread*, or *Butter-milk*, soft *Bones*, with such like good Dyet *Mornings* and *Evenings* which will keep him in a good state of body.

If he be sick, or low in state, then take *Sheeps-heads*, or *Feet* with the Wool on, chop them in small peeces, boyl them with *sweet Herbs* and *Oatmeal*, and make *Broth* thereof, which is very comfortable, and feed him therewith *Morning* and *Evenings* until he is recovered.

Their *Kennels* must be made airy, and the *Dore* into the *yard* should be towards the South for warmness; and let the *Benches* on which they are to lye, be about two foot and a half from the ground, with *Holes* bored in the *Boards* for their *Pists* to fall away; and on the *Benches* must be *Straw* which should be always fresh, and be sure to let their *Kennels* be kept clean.

When any of your *Dogs* are to run a wager, then give them *Dyet-Bread* thus made; Take half a Peck of dryed *Oatmeal*, and twice as much *Wheat*, let them be both ground, and bolted through a fine *Sieve*; then scatter amongst it some beaten *Annifeeds* and *Liquorice*, and knead it up with the whites of *Egs* and new *Ale* into small *Loaves*, which bake pretty hard; and this Bread give them soaked in Broth, as aforesaid, *Morning* and *Evening* after you have aired and walked them; and this will bring them to strength of wind and body.

The *Exercise* of your *Greyhound* consists in *airing* and *coursing* him; you must *Course* him at least twice a week, if your *Courses* be long and strong, else every other day; and in *Coursing Reward* and encourage him with the *Blood*, that he may delight in his *Course*.

At the first *Entring* him, for once or twice let him have an advantage of the *Game*, which is best to be a young *Hare*, and not giving her *Law*; but afterwards you may let him labour for it; yet not so much as to baffle him by giving the *Hare* too great *Law*. And thus you may discern the uttermost ability and strength of your *Dog*.

After a hard *Course* it were not amiss to wash his Feet with *Water* and *Salt* (which is far better than broaken *Beer* and *Butter* made luke-warm, being the usual way) and so put him to his *Kennel*, and about half an hour after feed him.

If he kils his *Game* he must be *Rewarded* by giving him the *Heart*, *Liver* and *Lights*; but suffer him not to break the *Hare*, but take her from him, otherwise he will be brought to an ill custom many times in tearing those he kills, before you can come in to him.

Upon *Coursing days* give him in the *Morning* before you *air* him a *Toast* and *Butter*, or *Toast* and *Oyl*, and nothing else.

Your *Airing* must be thus; first rub him with a *hair cloth* in his *Kennel*; then take him into your *Leach* about half an hour after *Sun*-rising, and walk him out into some place where no *Sheep* or *Cattle* are, suffering him to play with you, and to frisk about to empty himself; then take him into your *Leach* and lead him home to his *Kennel*; the same method must be used in the Evening; and in the Winter permit him once a day to enjoy the benefit of the *Fire*: And it were not amiss if you keep him always in his *Kennel*, where he may neither do nor receive hurt; And it is observed to breed in them Lust, Spirit and Nimblenes, and keep the *Pores* from Spending until time of necessity.

Greyhounds that are bred in low fat Grounds and deep Vales, are said to out-run those that are bred in smooth *Downs*.

COURSING.

Coursing with *Greyhounds* is a Recreation in great esteem with many of the Gentry; it affords greater pleasure than *Hunting* in some respect; as First, In regard it is sooner ended. Secondly, It requires less toyl. Thirdly, The *Game* is for the most part always in sight. And lastly, In respect of the delicate shape, and qualities of a *Greyhound*.

There are three several *Courses* with *Greyhounds*, *viz.* At the *Deer*, at the *Hare*, and at the *Fox*.

For the *Deer* there are two sorts of *Courses*; the one the *Paddock*, and the other either in a *Foreſt* or *Purlieu*. For the *Paddock* there must be the *Greyhounds* and the *Teazer*, which is a kind of a *Mungril Greyhound*, whose business is to drive away the *Deer* before the *Greyhounds* are slipt; and most usually there is let slip a *Brace*, or a *Leesh*, seldom exceeding two *Brace*.

The PADDOCK COURSE, with the description of a Paddock.

A *Paddock* is a peace of ground encompassed with *Pales* or a *Wall*, and most commonly taken out of a *Park*; It must be a *Mile* long, and about a quarter of a *Mile* broad; but the further end must be somewhat broader than the near; and the reason is, because most people desire to see the end of the *Course*, and who wins the Wager At the hither end must be the *Dog-house*: where the *Dogs* are kept that are to run the *Course*, which must be attended by two Men, and one of them to stand at the Dore to slip the *Dogs*, and the other must be a little without the Dore to let slip the *Teazer*, to drive away the *Deer*, as aforesaid. On the other side must be made three *Pens*, for as many *Deer* as is designed for the *Course*; and there must be also a *Keeper* or two to turn out the *Deer* for the *Course*. The *Deer* are to run all along by the *Pale*, and on the other side at some distance stand the *Spectators*. There must also be placed along the *Course* these *Posts*; The First, which is next the *Dog-house* and *Pens* is the *Law post*, which is distant from them 160 Yards; The Second, is the quarter of a *Mile post*. The Third the Half-mile *Post*: The fourth the *Pinching-post*; And the Fifth is the *Ditch* which is in lieu of a *Post*, being a place so made to receive the *Deer*, and keep them from being further pursued by the *Dogs*: near to this place are made Seats for the *Judges* to sit, who are chosen to decide the *Wager*.

As soon as the *Greyhounds* that are to run for the *Plate*, or *Money*, are led in to the *Dog-house*, they are delivered to the *Keepers*, who by the *Articles* of all *Courses* are to see them fairly slipt; to which purpose there is put about each *Dog* a *falling Coller* which they slip through the *Rings*; After the owners of the *Dogs* have drawn Cuts which shall have the *Wall*, by reason that there shall be no advantage more to the one than the other. Then the *Dog-house Dores* are shut, and the *Keeper* ordered to turn out of the Pens the breathed *Deer*; and so soon as the *Deer* is turned out, and gone about 20 Yards, then he that holds the *Teazer* slips him to force forward the *Deer*: Then when the *Deer* is come to the *Law post* the *Dog-house Dore* must be opened, and the *Dogs* led out and slipt: If the *Deer* *ſwarve* before he comes to the *pinching Post* so much that his *Head* be judged to be nearer the *Dog-house* than the Ditch, then 'tis judged no March, and in such case it must be run again three days after. But if there be no such swarve, but that the *Deer* runs straight until he comes beyond the *Pinching Post*, then that *Dog* that is the neareſt the *Deer* when he *swarves* or is *blanched* by any accident, wins the March: But if no such swarve happens, then that *Dog* that leaps the *Dich* first, wins the March; all which is to be determined by the *Judges* who sit as *Spectators*, as aforesaid; and if other disputes arise about the *Course* it is referred to the *Articles* of the *Course*.

The Course of the Deer in the Forest or Purlieu.

There are two ways used, the one is Coursing from *Wood* to *Wood*, and the other upon the *Lawns* by the *Keepers Lodg*.

If you Course from *Wood* to *Wood*, first throw in some young *Hounds* into the *Wood* to bring out the *Deer*, and if any *Deer* come out that is not weighty, or a *Deer* of *Antler*, which is *Buck*, *Sore* or *Sorell*, then do not slip your *Greyhounds* that are held at the end of the *Wood* where the *Deer* is expected to come forth, which the *Keepers* have good judgment to know. And if you mistrust that your *Greyhounds* will not kill him, then you may *Way-lay* him with a Brace of Fresh *Greyhounds*.

For the *Coursing* upon the *Lawn*, when you have given the *Keeper* notice he will lodge a *Deer* fit for your *Course*; then by coming under the Wind you may come near enough to slip your *Greyhounds* for a fair Course.

COURSING the HARE.

For *Coursing* the *Hare*, the best way is to go and find out one sitting, which is easily done, by walking cross the Lands, either *Stubble*, *Fallow*, or *Corn*, and casting your *Eye* up and down, for during the *Summer season* they frequent such places for fear of Ticks that are common in *Woods*; also the *Rain* and the Fall of the *Leaf* doth offend them; the rest of the year beat up and down with your *Poles* to *start* them out of their *Forms* and *Retreats*, and some *Hares* will not stir until they are almost touched, and 'tis a sure sign that such *Hares* make an excellent *Course*.

If a *Hare* sit near any *Close* or *Covert*, and have her Head towards the same, which a fair Field behind her, you may ride with as much *Compayn* as you have between her and the *Covert* before she be put up, and then she is likely to make her *Course* towards the *Champain*, for she seldom takes the same way that her Head is of when she sits in her *Form*.

When a *Hare* is first started you give her Ground or *Law*, which commonly is 12 score Yards, or more, according to the ground where she sits; or else you lose much of your Sport by putting too soon an end unto it, and it is very pleasing to see the *Turns* and *windings* that the *Hare* will make to save her self, which sometimes prove effectual unto her.

COURSING the FOX.

In Coursing the *Fox* there is required no other Art than to stand close, and on a clear Wind, on the out-side of some *Grove* where you expect his coming out, and then give him head enough, otherwise he will turn back to the *Covert*; for the slowest *Greyhound* will be swift enough to overtake him; and all the hazard of this *Course* is the Spoiling your *Dog* by the *Fox*, which oft times happens; and therefore you should not run any that are worth much at this *chase*, but such that are hard bitten *Dogs* that will seize any thing.

The Laws observed in Coursing.

I shall conclude this *Chapter* with the *Laws* of *Coursing* as they were established by the Duke of *Norfolk* in the Reign of Queen *Elizabeth*, which were subscribed unto by the chief *Gentry*, and so held Authentick.

That he that is chosen *Fewterer*, or that lets loose the *Greyhounds*, shall receive the *Greyhounds* match'ed to run together into his *Leesh* as soon as he comes into the field, and follow next to the *Hare-finder*, or he that is to start the *Hare* until he come unto the *Form*, and no *Horsman* or *Footman* are to go before, or on any side, but directly behind for the space of about 40 Yards.

You ought not to Course a *Hare* with above a brace of *Greyhounds*.

The *Hare-finder* ought to give the *Hare* three *Bo-hoes* before he put her from her *Form*, or *Seat*, to the end the *Dogs* may Gaze about, and attend her starting.

They

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They ought to have Twelvescore Yards *Law* before the *Dogs* are looſed, unleſs there be danger of loſing her.

That *Dog* that gives the firſt *Turn*, and if after that there be neither *Cote*, *Slip*, or *Wrench*, then he wins the Wager that gives the firſt *Turn*.

If one *Dog* give the firſt *Turn*, and the other bears the *Hare*, he that bears the *Hare* ſhall win.

A *Go-by* or *Bearing* the *Hare*, is reputed equivalent to two *Turns*.

If neither *Dog* turn the *Hare*, he that leadeth laſt to the *Covert* wins.

If one *Dog* Turns the *Hare*, ſerves himſelf, and Turns her again, it is as much as a *Cote*; for a *Cote* is eſteemed two *Turns*.

If all the *Courſe* be equal, he that bears the *Hare* ſhall win; and if ſhe be not born, the *Courſe* ſhall be adjudged dead.

If a *Dog* take a Fall in a *Courſe*, and yet perform his part, he may challenge the advantage of a *Turn* more than he gave.

If a *Dog* Turn the *Hare*, ſerve himſelf, and give divers *Cotes*, and yet in the end ſtand ſtill in the Field; the other *Dog*, if he *Turns* home to the *Covert*, although he gives no *Turn*, ſhall be adjudged to win the *Wager*.

If by Misfortune a *Dog* be rid over in his *Courſe*, the *Courſe* is void; and to ſay truth, he that did the miſchief ought to make reparation for the Damage.

If a *Dog* give the firſt and laſt *Turn*, and there be no other advantage betwixt them, he that gave the odd *Turn* ſhall win.

A *Cote* is, when the *Greyhound* goeth End-ways by his Fellow, and gives the *Hare* a *Turn*.

A *Cote* ſerves for two *Turns*, and two *Trippings* or *Jerkins* for a *Cote*; and if ſhe turneth not quite about ſhe only wrencheth.

If there be no *Cotes* given between a Brace of *Greyhounds*, but that one of them ſerves the other at *Turning*; then he that gives the *Hare* the moſt *Turns* wins the *Wager*: And if one gives as many *Turns* as the other, then he that beareth the *Hare* wins the *Wager*.

Sometimes the *Hare* doth not *Turn*, but *Wrench*; for ſhe is not properly ſaid to *Turn*, except ſhe *Turn* as it were round, and two *Wrenches* ſtand for a *Turn*.

He that comes in firſt to the Death of the *Hare*, takes her up, and ſaves her from *breaking*, cheriſheth the *Dogs*, and cleanſeth their *Mouths* from the *Wool*, is adjudged to have the *Hare* for his pains.

Thoſe which are *Judges* of the *Leeſh*, muſt give their Judgment preſently, before they depart out of the Field.

CHAP. XIV.

Of Taking and Hunting the CONEY or RABET, with Dogs, Nets *and* Ferrets, *and how to Order a* Warren; *with Directions for the Breeding and keeping Tame* Rabets.

THe *CONEY*, though it yield not ſo great pleaſure in *hunting* as the *Hare*, as being endowed with none of thoſe ſlights and cunings; yet it is of greater profit, both in regard of their *Fleſh*, and their *Skins*, which excel thoſe of the *Hare*.

The *Does* go with Young a Month, and then they *Kindle*; and if ſhe taketh not *Buck* preſently ſhe loſeth her Month, or at leaſt a Fortnight, and often kills her Young, eating them, eſpecially the *Bucks*. They begin to breed at about half a year old, commonly breeding two, three, or four times a Year, and about five, ſix or ſeven at a Litter. When the *Buck* goeth to the *Doe*, he beats and ſtamps with his *Feet* very hard, which (as 'tis ſaid) cauſeth heat in him; and having *ſtruck* or *buckt* her, falls down backwards, ſo lying for ſome time as it were in a Trance, until he hath recovered himſelf, at which time it is eaſie to take him. The *Bucks* will kill the Young Ones, if they can come at them; and therefore Nature hath ſo decreed it, that the *Does* prevent them by ſtopping or covering their *Stocks* or *Neſts* with *Earth* or *Gravel*, which they cloſe up ſo artificially with their *Breeches*, that it is hardly to be diſcerned; and they never Suckle them but early in the *Mornings*, and late at *Nights*, cloſing the Holes every time after their coming out for eight or ten Days; after which time they begin to leave it a little open, and by degrees as they grow big, which is at about three Weeks old, they leave it quite open for them to come out, they being then fit to eat *Graſs*.

In ſuch places in the *Warrens* where the ground is *Rocky* and *Stony*, it were not amiſs to have *Artificial Burrows* made; and if your *Warren* were incloſed with a *Brick-Wall* (whoſe Foundation ſhould be deep) it would be of great advantage, for then it would obſtruct the *Rabets* from ſtragling out to be loſt; alſo it would prevent their being ſtole by Idle Fellows; and likewiſe it would hinder *Foxes*, *Badgers*, *Pole-Cats*, and the like *Vermin* from getting in, being great Enemies to *Warrens* by deſtroying them; therefore thoſe *Warreners* that have not ſuch Conveniences and Secure places, muſt be the more diligent to hunt and beat them in three or four times a *Week*, or *Daily*, to prevent their ſtragling out for freſh *Paſture*; as alſo to deſtroy thoſe *Vermin* by *Traps*, *Snares*, and *Engines*, as hereafter ſhall be treated of, for otherwiſe your *Warrens* will never be well ſtockt.

The

The beſt and ſureſt way to ſtore a *Warren*, is to provide near your *Lodge* (for though *Coneys* require neither *food* nor *water*, but what they can get, except in exceeding *hard Weather*, and of a long continuance; and at ſuch times they muſt be relieved with *Hay*, the *Boughs* of *Trees* and *Bark* to browz upon, yet you ſhould have a *Warrener* to attend them, to preſerve them from being deſtroyed by *Thieves* and *Vermin*) a handſom incloſed place, with a *Penthouſe*, under which you may have ſeveral *Hutches* for the keeping *Tame Rabets*, for they are large and great Breeders: 'Tis true, their *Fleſh* is ſomething more rank of the Old Ones that are kept up, occaſioned through want of Exerciſe, but the Young Ones are eſteemed better; but when once you turn them out to become wild, they ſoon loſe that Rankneſs, and become free Denizens of the *Soil* where you put them. When the Young Ones are big enough to ſhift for themſelves, you may put them into your *Warren*, with a little reſpect to the Seaſon of the Year in regard of the *Cold*; for thoſe Young Ones at a Month old are leſs able to endure *Cold*, as being never accuſtomed to it, than thoſe of a few Days, that have their *Dams* to cheriſh them.

The *Hutches* wherein you keep your *Breeders* muſt have divers *Cells* or *Neſts*, and they muſt be kept neat and clean, otherwiſe *Diſeaſes* will breed amongſt them. Likewiſe the *Bucks* muſt be kept apart from the *Does* until they have juſt *Kindled*, and then they muſt be taken from the Young and put to the *Buck*; and you may eaſily know when ſhe is *ſtruck* enough, for then ſhe will avoid the *Buck*. *Tame Rabets* breed ſeven or eight times in a Year, and eight or nine at a *Litter*. For the chooſing of *Tame Rabets*, take the biggeſt and faireſt you can get, and if you can, let them be Black, or Silver-haired; for thoſe *Skins* do exceed the other in price.

Their *food*, as before noted, may be *Coleworts*, *Cabage-Leaves*, *Carats*, *Parſnips*, *Clivers*, *Apples*, *green Corn* and *Fetches* in time of Year, with ſuch like moiſt Food; but you muſt always obſerve to give them a proportionable quantity of dry Meat, as *Bran*, *Bread*, *Hay*, *Oats*, and the like, otherwiſe they will be Pot-bellyed, and ſo dye. You may alſo give them *Bran* and *Grains* mixt together, which is very good Food.

One *Buck* may very well ſerve nine or ten *Does*, and no more.

If your *Warren* be very barren, you may ſow about an Acre or two of *Summer Corn* for their Food, which will turn to good profit.

The ways to take Coneys.

FOr the taking of *Coneys* there are divers ways to be uſed, ſome of which I ſhall here take notice of, as being a *Beaſt* of no great skill or ſubtilty. You may *hunt* ſuch as ſtraggle from their *Burrows* with ſmall *Greyhounds* or *Mungrels*, bred up for that purpoſe; and the places for *hunting* them are amongſt *Buſhes*, *Hedges*, *Corn-fields*, or *freſh Paſtures*; and though you miſs killing them, yet thereby you drive them back to their *Retreats*, and preſerve them from being a Prey to others.

You may alſo drive them into their *Burrows*, and ſpread *Purſ-nets* upon the *Holes*, ſo that when they come out they will be entangled in them, and ſo become taken. Now to force them out 'tis good to have a *Feret*, or two whoſe *Mouths* muſt be couped or muſled up, and ſo put into the *Holes*, which will cauſe them to bolt out into your *Purſ-nets*; for the *Coneys* do eaſily ſmell the *Ferets*, and at their approach (being of a fearful Nature) dare not ſtay to ſee them. And for the more ſurer taking them, it were good to have in readineſs a *Hay* or two, which ſhould be pitched up at a ſmall diſtance againſt the *Burrows* you intend to hunt, according to the *Figure* repreſented in the *Plate* for taking *Coneys*.

Of the FERET.

THe *Feret* is a little Creature, but of a bold and audacious Spirit, and an Enemy to all others but her own kind, delighting to ſuck the *Rabets* Blood, rather than to eat their Fleſh; but being tamed are uſeful to the *Warrener* for the forcing the *Coneys* out, as before noted. It is unneceſſary to give you a deſcription of it, being ſufficiently well known; only let me tell you, that they go with young ſix Weeks, and uſually bring forth ſix or ſeven at a time; their Young are blind a Month, and that after two Months more they are fit for Service. The *food* that is given them is *Milk*, *Sheeps-Hearts*, *Livers*, *Raw-fleſh*, and the like; they ought to be kept in *Tubs*, or other convenient places where they can't get out, and to have freſh *Straw*, for they are very naſty and of an ill ſavour. Before you go to *Hunt* with them, do not feed them; for when their *Bellies* are full they will be idle, and not hunt, lying *ſleeping* in the *Burrows* two or three hours together before they come forth, and ſometimes much longer. When you have done *hunting* with them, uncoup them, and *Reward* them with the *Rabets Liver*, which they much delight in; and ſo put them up into your *Bag*, and carry them home.

I ſhould here ſpeak of the *Lircher* or *Tumbler*, a *Dog* ſo called by reaſon of his Wiles and circumventing Tricks to take them; but having treated of him already in the *Second Chapter*, that treats of the ſeveral ſorts of *Dogs*, I ſhall forbear to ſpeak any thing here.

I ſhould alſo treat of the taking the *Coney* with *Engines*, *Traps*, *Snares*, *Nets*, &c. but being intended to ſpeak thereof in the *Chapters* that treat of the taking the *Fox*, *Otter*, *Badger*, *Hare*, &c. as alſo of the *Polecat*, *Fitchet*, and the like *Vermin*, I ſhall not ſay any thing here, but refer you to the ſame for further ſatiſfaction.

Ge CHAP.

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CHAP. XV.

Hunting the OTTER.

THe *OTTER* is an Amphibious Creature, having his habitation as well in the *Water* as on the *Land*, and refembleth the *Beaver* were it not for his *Tail*; and although the *Otter* hath much of his abode in the *Water*, yet he doth not breath like *Fiſh* through the benefit of the *Water*, but like other Four-footed *Beaſts*, and will remain under the *Water* for a good while without reſpiration.

The *Otter* always reſides near great *Ponds* or *Rivers*, and preyeth on all manner of *Fiſh*, of which he is a great deſtroyer, and if not obſtructed will in a ſhort time clear a whole *Pond*, and for want of prey in the *Water* will make his incurſions within *Land*, and if all fail will feed on *Roots*, *Herbs*, or what not to fill his *Belly*; nor will he take leſs pains in the *Water* to ſatisfie his hunger, being ſaid to ſwim above a Mile againſt the ſtream to get his *Prey*, which according to obſervation he ſmells a good diſtance; and when he hath filled his *Belly*, he is carried down the Current at eaſe to his *Couch*, *Hough*, or *Lodging*, which is always near the Water, or in ſome hollow *Stump*, or Root of a *Tree*, very Artificially built with *Boughs*, *Sprigs*, and *Sticks*, wherein he ſits; and when he lifts up his *Noſe* above Water for Air, it is Termed *Venting*; nor will he remain long in a place, for fear of a Surprize, or for ſome better Convenience, having an excellent *Ear* for hearing, and as good a *Noſe* for *Smelling*, being eſteemed a very ſubtile Creature, and very Nimble in taking his *Prey*; and for greedineſs, deſtroys far more than he Eats, ſeldom eating farther than the *Navel*, leaving the Tail part, diving deep under the Water, ſo that no *Fiſh* can hardly eſcape him, unleſs thoſe that are very large, and ſwift of Swiming.

The *Otter* when Reclaimed, is of great uſe and pleaſure, by reaſon of the great quantities of *Fiſh* they take, which as being ſo taught, they bring to their *Maſter* or *Keeper*.

They go to *Sault* at ſuch times as *Ferets* do, and bring forth their young, ſometimes more, ſometimes leſs. They are Footed like a *Gooſe*, with a *Web* between their *Claws*, having no *Heel*, but only a round *Ball* under the Sole of their *Feet*, the Impreſſion of which is Termed the *Mark* or *Seal* of an *Otter*; Their *Excrements* are termed *Spraits*, their *Stones* are reported to be good againſt the *Falling-Sickneſs*; and the *Skin* of a well grown *Otter*, is worth twelve or fifteen Shillings, and ſometimes more, if it be of a ſhining Black, and of theſe *Skins* are made excellent *Muffs*; Their *Fleſh* is not over wholſom, yet eaten in *Germany*.

There is much ſubtilty to be uſed in the *Hunting* the *Otter*, yet by cuning and pains, they may be enſnared under Water, and by the River ſides.

If you would *Hunt*, or Train an *Otter*, you muſt be provided with *Otter-Hounds*, and *Spears*, and be ſure to have a *Draught Hound* or two that will hunt in the *Lyame*; and ſet on each ſide of the *River* one of them, with about two Couple of *Hounds*, and a *Man* or two to attend; and obſerve his *Vents*, that you may ſtrike him with your *Otter-Spear*; or if you miſs, then to purſue him with your *Hounds*; and if they are good and well entred for the Sport, they will come Trailing along by the *River* ſide, beating every *Tree Root*, *Oſter-Bed*, or *Tuft* of *Bull-ruſhes*, and ſometimes will take the *Water* like *Spaniels*; and if any of the *Hounds* finds him out, then look in the moiſt places to ſee which way he bent his Head; for if the Marks make no Diſcovery, you may partly find it by the *Spraits*, and ſo follow the *Hounds*, and *Lodge* him as you do a *Deer*. You may uncouple ſome of the *Hounds*, and walk beating up and down the ſides of the River, under the *Buſhes*, *Stubs* of *Trees*, and in the *Holes*; and you ſhould rather beat up againſt the Stream than down it, by reaſon the *Otter* uſeth to *Fiſh* againſt the Stream, the better to get *Scent* of the *Fiſh*.

If you find him not quickly, you may judge he is gone to *Couch* ſomewhere further off from the *River*, for every Night he ſeeks his *Prey* on the *Land*, and makes his *Spraits* ſo, that if there be an *Otter* in that *Quarter*, you may ſoon find it out, either by the *Hounds*, or by his *Spraits*.

The *Huntſman* having carefully beaten the moiſt places as aforeſaid, and found which way he bent his Head, which may often be diſcovered by its *Marks*, he may then lodge him any Evening; But if he do not quickly make him out, he may be ſure he is gone to *Couch* farther off from the *River ſide*; and when the *Huntſman* hath lodged him in his *Couch*, he muſt not uncouple the *Hounds* until he be within about a *Bow-ſhoot* or two of the place, for he will preſently make away upon the firſt Noiſe, and draw towards the *River*, where ſome freſh *Dogs* muſt be laid ready to intercept him.

The *Huntſman* muſt alſo have *Otter Spears* to dart at him, and wound him in the Water when he *Vents*, for when they find themſelves wounded with the *Spear*, they preſently make to Land, where they furiouſly encounter the *Hounds*. After the *Dogs* are once well Entred, they will eagerly follow the *Chaſe*, leaving no place unſearched that is fit for their reception, as *Holes*, *Oſter Beds*, or the like moiſt places.

CHAP. XVI.

Hunting the BEAVER.

THe *Beaver* as before noted, differs not much from the *Otter*, but only in his *Tail*; there are great quantities of them in *Virginia*, *New-England*, *New-York*, and thoſe parts, and their *Skins* are found a good *Commodity* here in *England*,

HUNTING ỹ OTTER
To ỹ Rt Worſhipfull Sr John Hobart of Blinkling in Norfolk
Bart heyre male to Sr Hen Hobart Kt & Bar. Cheife Juſtice
of ỹ Common Pleas; who deſcended from ỹ 2d ſon of Sr James Hobart
of Hales in ỹ S. County Attourny Generall to K. Henry the 7th
This Plate of Hunting ỹ Otter is humbly dedicated by Ric Bloome
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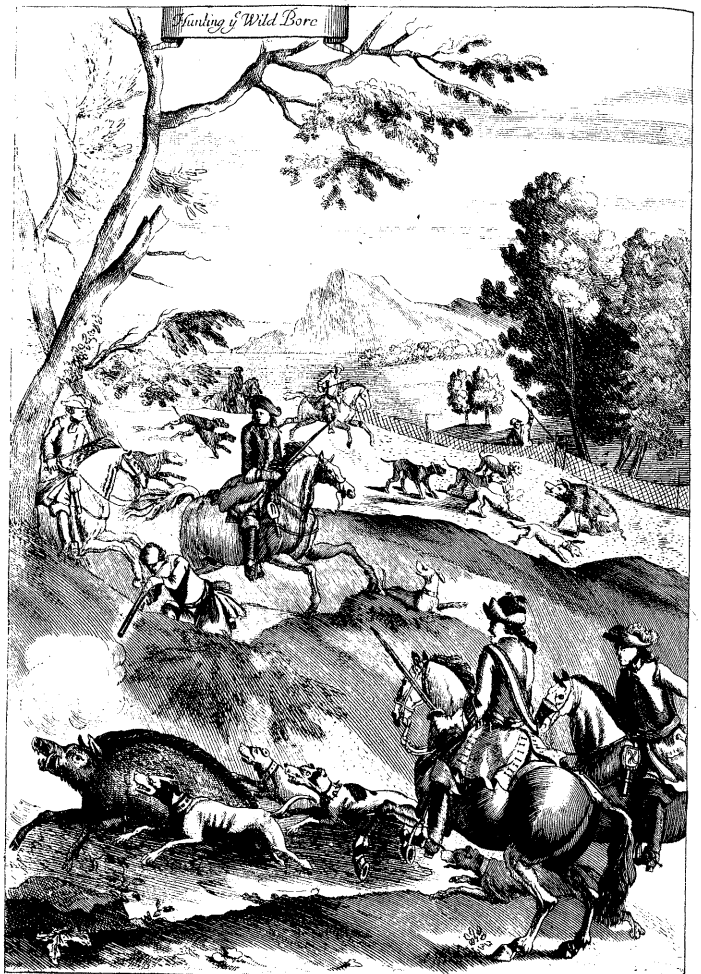

To his Royall Highness George Prince of Denmarke &c.a

This plate is most humbly Dedicated by Richard Blome

England, for making of *Beaver Hats*. They are an Amphibious Creature, as the *Otter* living on Land and Water, both Fresh and Salt; and without Water they can't subsist, much participating of the Nature of Fish, which may be concluded from their hinder *Legs*, and *Tails*. They are much about the bigness of *Mungril Curs*, their *Forefeet* are like those of a *Dog*, and their hinder like that of a *Goose*, having a *Web* to assist them in their *Swiming*; their *Head* is short, with small round *Ears*; their *Teeth* are very long, broad and strong, standing out above their *Lips* about three Fingers broad; and their Teeth being their only Weapon to defend themselves against other *Beasts*; and with their *Teeth* they will soon gnaw down a small *Tree*; their *Tail* is very strange, being without Hair, and covered over with a *Skin*, like the *Scales* of *Fish*, and is about half a Foot long, and for the most part six Fingers broad.

They are taken for their *Skins* and *Cods*, which are of a high price; And for the taking them, you must find out their *Caves*, in which are several *Chambers*, or places of *Retreat*, built by the Water side, to ascend or descend according as the *Water* riseth or falleth; and the building of them is almost wonderful to behold, being made of Sticks, and plaistered with Dirt very artificially, in form of a *Bee-Hive*, but for largness, to a good big Oven.

Their *Caves* or places of abode being found, a breach must be made therein, into which put a little *Dog*, which when the *Beaver* perceiveth, immediately gets to the end of her *Cave*, and there defends her self with her *Teeth*, untill all the building is destroyed, and she laid open to her *Enemies*, so that soon she becomes their Prey.

The *Dogs* used for killing them, are such as for the *Otter*.

The *Beaver* can't dive long under Water, but must put up his *Head* for Breath; and then they shoot him, or strike him with their *Spears*, which are such as used for the *Otter*.

In *Virginia*, *New-England*, &c. there are great store of them, and one that dwelt in those parts gave this Account of them, That they dwell, or inhabit in low moorish boggy places, through which runs a *Rill* of *Water*, and this *Rill* at some convenient place they stop, by making a Dam cross it, to raise the Water Breast high; and by this Dam which is made Artificially with *Earth* and *Sticks*, they make their *Caves*, and to which belongs commonly two or three hundred *Beavers*, resembling as it were a *Town*. If this *Dam* at any time is broken by any to take them, or otherwise becomes decayed, the Water being their chief refuge, it is immediately repaired by them. And that by Obsérvation they have a chief, or King over them, who takes care thereof, and the rest are obsérvant to him, to work when he assembleth them together, which is done by the slaping his *Tail* in the Water, making a Noise.

CHAP. XVII.

Hunting the WILD BOAR.

ALthough *England* affords no *Wild Boars*, yet being so plentiful in *Germany* and other *Countries*, and affords so Noble a *Chase*, which is so much used by the *Nobility* and *Gentry* in those parts, tis thought necessary to add this Discourse following.

The *Boar* being a *Beast* of such great force, and so slow of Foot, by reason of his heaviness, that he is not properly Termed a *Beast* of *Venery*, for he chiefly trusts in his *Strength* and *Tusks* to be his Defence, and not to his *Feet*; so that he is more properly to be hunted by Stout *Mastiffs*, than by *Hounds*, who can't defend themselves so well from his fury: Also it spoils them from *Hunting* other flying *Chases*, by reason he leaveth so strong a Scent, so that they hunt with the greater ease than at light *Chases*, which are more painful unto them to find, and to hold the *Scent*.

The Nature and Subtilties of the Boar.

THe *Boar* is of this Nature, that when he is *Farrowed* hath all his *Teeth*, amongst which he hath four *Tusks*, on each side two, and with those on the lower *Jaw* he defends himself, as being greater and longer than the rest.

The common Age of a *Boar* is twenty five or thirty years; they go to *Rut* about *December*, and their great heat endures about three Weeks; and although the *Sows* become cold of Constitution, not coveting the Company of the *Boar*, yet they do not separate until *January*; and then they withdraw themselves unto their holds, wherein they keep close three or four days, not stiring thence, especially if they meet with such places where *Fern* grows, whose *Roots* are sweet and pleasing to them.

It is easier to bring a *Boar* into a Soil in *April* or *May*, than in any other Season, by reason they sleep at that time more soundly, which is occasioned by their eating of strong *Herbs*, and *Buds* of *Trees*, which moistens their *Brains*, and causeth *Sleep*. Also the *Spring* time occasions their Sleeping.

Their *Food* is on *Corn*, *Fruits*, *Acorns*, *Chesnuts*, *Beech-Masts*, and all sorts of *Roots*; when they are in the *Marshy* and *Watery* places, they Feed on *Water-Cresses*, and such like things as they can find; and when they are near the *Sea-Coast*, they Feed on *Cockles*, *Muskles*, *Oyster* and such like *Fish*.

A *Boar* most commonly lies in the strongest holds of *Thorns* and thick *Bushes*, and will abide the *Bay*, before he forsake his *Den*. If you hunt him from a strong thick *Covert*, he will be sure to go back the same way he came, if possible; and when he is rousted, he never stays until he comes to the place where he thinks himself most secure. If it so happen, that there is a *Sounder* of them to-

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together, then if any break *Sounder*, the reſt will run that way; and if he be hunted in a *Hold*, or *Foreſt* where he was bred, he will hardly be forced to quit it, but ſometimes he will take head, and ſeem to go out, drawing to the outſides of the *Covert*, but 'tis only to hearken to the Noiſe of the *Dogs*, for he will return again, from whence he will hardly be compelled till Night; but having broken out, and taken head endways, will not be put out of his way for *Man* or *Beaſt*.

A *Boar* will not cry when he is killed, eſpecially a great *Boar*, but the *Sows* and young ones will. In Fleeing before the *Dogs*, he neither doubleth nor croſſeth, nor uſeth ſuch Subtilties as other *Beaſts* of *Chaſe* do, as being heavy and ſlow, ſo that the *Dogs* are ſtill in with him.

Terms of Art uſed in Hunting the Boar.

A *Boar* of three years old is called a young *Boar*, that hath lately left the *Sounder*, and an old *Boar* is called a *Sanglier*, that hath left the *Sounder* four or five years.

A *Boar* is ſaid to Feed in the *Corn*, but if in the *Meadows* or *Fallow Fields* then he *Routeth* or *Wormeth*; but when he Feeds in a *Cloſe* and *Routeth* not, then he *Graiſeth*.

How to know a great Boar by his Foot, by his Routings, and by his Soil.

TO know an old or great *Boar* by the *Foot*, the form or print thereof ought to be great and large, the *Toes* round and Thick, the edge of the Hoof worn and blunt, without cuting or paring the Ground ſo much as the younger doth; and the Gards which are his hinder *Claws*, or *Dew-Claws*, ſhould be great and open one from the other; the treading of his *Foot* ſhould be deep and great, which ſheweth the weightineſs of his *Body*, and his Steps ſhould be great and long.

By the Largneſs and depth of his routing, his greatneſs may be known; his greatneſs is alſo known by the length and largneſs of the *Soil*, when he wallovveth in the *Myre*: Alſo when he comes out of the *Soil*, he will rub himſelf againſt a *Tree*, by which his height appears.

How to hunt the Boar at force with Dogs.

THe Seaſon for *hunting* the *Boar* begins about mid-*September*, and ends in *December*, at which time they go a *Brimming*.

It is not convenient to hunt a young *Boar*, of three years old at force; for he will ſtand up as long (if not longer) than a light young *Deer*, that beareth but three in the top; but when he is in his fourth year he may be hunted at force, as well as a *Hart* of ten, and will ſtand up as long. Therefore if a *Huntſman* goes too near a *Boar* of four years old, he ought to mark well whether he went timely to his *Den* or *Couch*, or not; for commonly thoſe *Boars* which tarry till it be day-light go into their *Dens*, following their *paths* or ways a long time, eſpecially where they find *Fern*, or *Bed-maſts*, whereupon they feed; they are very hardy, and the *Huntſman* needs not be afraid to come near unto ſuch a *Boar*, forhe will not eaſily be reared; But if he find a *Boar* which *Soileth* often times, and which *routeth* ſomtimes here and ſomtimes there not ſtaying long in a place, 'tis a ſign that he hath been feared and withdraweth himſelf to ſome reſting place, and ſuch *Boars* moſt commonly come to their *Dens* or *holds* two or three hours before day, and then the *Huntſman* muſt be careful not to come too near them, for if they once find him in the Wind, or have the Wind of his *Dogs*, they will ſoon be gon.

If a *Boar* deſigns to tarry in his *Couch*, he makes ſome *doublings* or *croſſings* at the entry thereof, and then lyeth down to reſt, and being early in the *Wood* you may judge of his ſubtilty, and accordingly prepare to hunt him with *Dogs* that are either hot ſpirited, or temperate; for if it be a great *Boar*, and one that hath lain long at reſt, he muſt be hunted with *Dogs* that will ſtick to him, and let the *Huntſmen* on *Horſback* be amongſt them, charging the *Boar*, and forcing him as much as poſſible, to diſcourage him; for if you *hunt* ſuch a *Boar* with four or five Couple of *Dogs* he will not regard them, and when they have a little chaſed him he will take courage and keep them at *Bay*, ſtill runing upon any thing that he ſeeth before him; but if he perceive himſelf charged, and hard laid unto with *Dogs* and *Huntſmen*, then he abateth his courage, and ſleeth to ſome other place for Refuge. You muſt alſo ſet *Relays*, which ſhould be of the beſt old *Staunchest Hounds* of the *Kennel*; for if you ſhould make your *Relays* with young *Hounds* and ſuch that are ſwift and raſh to ſeize him before the reſt come up, they will be Spoiled or killed by him: But if he be a *Boar* that is accuſtomed to flee end-ways before the *Dogs*, and to take the *Champain Countrey*, then caſt off four or five Cople of *Dogs* at the firſt, and ſet all the reſt at *Relays*, about the entry of the *Fields* where you think he is likely to flee; for ſuch a *Boar* will ſeldom keep the *Hounds* at a *Bay*, unleſs he be forced, and if he do ſtand at *Bay* then the *Huntſmen* muſt ride in unto him as ſecretly, and with as little noyſe as poſſible, and being near him, let them caſt round about the place where he ſtands, and run upon him all at once, and it will be hard if they do not give him his deaths Wound with their *Spears* or *Swords*, provided they ſtrike not too low, for then he will defend the ſtroaks with his *Snout*, and be ſure keep not long in a place uſing a quick motion. And tis obſerved, that if you put *Collers* of *Bells* about your *Dogs necks*, a *Boar* will not ſo ſoon ſtrike at them but flee end-ways before them, and ſeldom ſtand at *Bay*.

If a *Boar* make head againſt the *Huntſman* he muſt not fly, but meet him with his *Spear*, having great regard to the motion of his Head, for his nature is ſuch, to ſnatch the *Spear* out of his hands, if he can by any ſubtilty, by which means he endangers his life; therefore when any ſuch thing ſhould happen, there is no way to ſave his life, but for another of the company to charge him home with his *Spear*, upon which he leaves his firſt Man, and ruſheth upon the ſecond, who muſt be very dexterous in the ordering his *Weapon* for fear of danger.

If you ſtrike at him with your *Spear* or *Sword*, ſtrike not low, as aforeſaid, to hit him on the *Snout*, for that he regards not, making it his great care to receive blows upon his *Tuſks*, but ſtrike down right, and in thus aſſaulting him, they muſt be very careful, for he will run or ruſh upon them with great fierceneſs.

The *Hunting-Spears* muſt be very ſharp, and broad, branching forth into certain *Forks*, ſo that the *Boar* may not break through them upon the *Huntſmen*; and the beſt places to wound him therewith are upon his *Shoulders*, or on his *Forehead* betwixt his *Eyes*.

When you firſt raiſe him out of the *Wood* (which is beſt to be in the Morning early, before he hath made Water) he uſeth to ſunſt in the Wind, to ſmell what is with or againſt him, and very ſeldome ſtrikes a Man till he be firſt wounded; and when he finds he is ſo wounded as not to live, he is ſo enraged, that he makes what ſlaughter he can, flying at all he meets with, and his *Teeth* are at ſuch time ſo hot that it cauſeth the Wound to be inflamed.

In the *Cloſe* of the *Boar* you are to obſerve the ſame diligence and devices, that is uſed in Hunting the *Hart*; for a *Boar* of three years old will ſtand as long before the *Dogs* as a light young *Deer*, which beareth but three in the top, as before taken notice of.

Reward, but it muſt not be the Fleſh of the *Vermin*, that being not good, neither will they meddle with it; therefore you ſhould hang them up on the end of the *Hunting Pole*, calling the *Dogs* together, that they may ſee it for their encouragment, but *Reward* them with pieces of *Bread*, or the like.

A *MARTERN* is about the bigneſs of a *Cat*, having a longer *Body*, and ſhorter *Legs*, with a *Head* and *Tail* like a *Fox*. This is the *Polecat* or *Wild-Cat*, a ſort of Vermin well known in *England* for their deſtructiveneſs to *Hens* and *Tame Fowl*.

Their *Skin* is a good *Fur*, nor is that of the *Polecat* without its virtues, being reputed very uſeful and comfortable for cold *Aches* in the *Bones* and *Joynts*, and the *Greaſe* is good for extending *Shrunck Sinews*.

CHAP. XVIII.

Of the POLECAT, FITCHET, and MARTERN.

POlecats, *Fitchets*, and *Marterns*, are a ſort of Vermin very deſtructive to *Warrens*, and *Hen-houſes*; they have a ſtrong Scent; they are not *Chaſes* to be fought or purſued after, yet when by accident they are diſcovered, they afford very good diverſion, and a *Hound* Croſſing on them will *hunt* them as merrily as any other *Chaſe*, and make a full Cry for the time they ſtand before them, which is not long; for they quickly betake themſelves to ſome *Tree*, and truſt to that policy ſooner than to their ſtrength; and yet it is much to ſee the ſtrength of nature of theſe Creatures, and how ſtoutly they will make their party good againſt the *Hounds*, *ſcratching*, *clawing*, and *biting* ſo, that moſt of them come off with Bloody *Noſes*; at laſt they betake themſelves to the *Trees*, leaping from *Bough* to *Bough*, and *Tree* to *Tree*; in the mean time the *Dogs* baying at them on the ground, and the *Huntſmen* pelting them with *Stones*, *Sticks*, and the like; alſo a *Croſs-Bow* or *Bow* with *Bolts* doth good execution, and ſoon puts an end to the *Hunt*.

The *Hunt* being ended, the *Dogs* expect their

CHAP XIX.

Hunting the SQUIRIL.

HUnting the *Squiril* affords excellent paſtime, and not without ſome profit; for both the *Fleſh* and *Skin* is uſeful, the former being good *Meat*, and the latter an excellent *Fur*; 'tis a very thrifty provident Creature, providing in the Summer-ſeaſon *Nuts* and ſuch like food in their *Neſts*, to keep them in the Winter, for they do not much care to ſtir abroad in cold Weather, eſpecially when the North and Eaſt *Winds* blow. They build their *Neſts*, (which by ſome are called *Drays*) in the Summer on the top of the *Trees* very artificially with *Sticks* and *Moſs* of an oval Form, like an *Egg*, with a hole in the midſt, that the Rain may not anoy them.

The way of *Hunting* them is with *Dogs*, which are to bay at them on the ground, which with the *Huntſmen* hollowing doth much affright them; and if one or two of the Company had ſmall *Drums* to beat, it would the more amaze them, and facilitate the Sport.

Then the *Men* pelt them with *Stones*, or *Cubit-ſticks*, as at the *Polecat*, courſing them from *Tree* to *Tree*. The *Croſs-Bow*, or the *Bow* and *Bolt*, as likewiſe the *Gun* makes a quick diſpatch of them.

The beſt Seaſon to *Hunt* them is in *Autumn*, when the Leaves are off the *Trees*; and indeed 'tis very pretty Sport to ſee them skip and jump from *Tree* to *Tree* with ſuch nimbleneſs to ſave themſelves, but all to little purpoſe, for in the end either the *Men* or *Dogs* ſeize them.

If they be driven to the ground from the *Trees*, and creep into the *Hedges*, 'tis a ſign of their wearineſs; for during their ſtrength they have ſuch lofty Minds, that they will keep the *Trees* with all the dexterity and ſubtilty they can.

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CHAP. XX.

To know by the Impreſſion of the Foot, *or by the* Dung, *any Foreſt Beaſt.*

HAd I only regarded *Hunting* in the common acceptation, only managed with *Men* and *Dogs*. I might have put an end to this Diſcourſe: But foraſmuch as there are other ways to attain the end, and thoſe peradventure more uſeful and commendable, I ſhall here treat of ſuch as are moſt approved of for the taking them.

But firſt, the skilful *Wood-man* ought to know the ſeveral *Impreſſions* of the Feet of every *Beaſt* of the *Foreſt*, which they leave imprinted in ſoft and moiſt places: And you muſt know that the *Females* make ſmaller Impreſſions than the *Males*: Nor ſhould the *Wood-man* be ignorant of the ſeveral *Excrements* of *Foreſt Beaſts*, and how to make uſe of every one for the taking their Fellows; for the *Dung* of all ravenous Creatures is of great uſe to draw them on into thoſe *Snares* and *Devices* wherewith you intend to entrap them; for ſhould you uſe any *Cord*, *Wood*, or *Iron*, which is not anointed over therewith, theſe *Creatuees* have that ſubtilty and good Scent, that they would avoid it; you ſhould therefore in making of *Trains* uſe *Cords* made of *Hay* and *Straw*, and not uſe *Ropes*; and when you ſet any *Engines*, if you can't get any of their *Dung*, be ſure get ſome *Carrion*, and with that rub them over.

Now for the having ſome of their *Dung* upon occaſion, as alſo to know what *Beaſts* are ſtirring in any place by their Tracts, obſerve theſe following Directions.

In ſome fair Evening, on the ſides of the *Thickets* or *Foreſts*, and by the *High-ways*, where in all probability thoſe *Beaſts* uſe to paſs, dig up the *Earth* with a *Hoe* or *Mattock*, bruiſing it ſmall or fine about four foot ſquare in a place, and ſo do in all likely Paſſes, to the end that whatſoever *Beaſt* comes over them it may leave his *Impreſſion*.

For *Beaſts* of Prey, as the *Wolf*, *Fox*, *Badger*, *Polecat*, *&c.* make a *Train*, and when you come to any of the places which you have ſo prepared, throw four or five bits of your *Train-Carrion* upon it, and of *Chickens Guts* for ſmaller *Beaſts*, and you need not doubt but ſuch *Beaſts* as eat of the *Train*, will leave ſome of his *Dung* behind him, as well as the *Impreſſion* of his *Foot*, and accordingly you may prepare for him againſt the next day; but uſe great circumſpection, for *wild Beaſts* are for the moſt part very ſubtile, of quick Scents, timerous, and jealous of every thing; only being preſſed with *Hunger*, or attracted by the provocations of *Luſt*, they are not ſo ſcrupulous.

Now foraſmuch as the deſtroying *Wolves*, and ſuch like ravenous *Creatures* (which make Wat ſometimes with *Man* himſelf) hath ever been eſteemed a commendable Exerciſe, and hath at all times been encouraged, I ſhall beſtow a *Chapter* or two in the diſcourſe thereof; notwithſtanding at preſent *England* is not anoyed with any of thoſe ſtrong and great Devourers, which heretofore inhabited our *Woods* and *Foreſts*; but however *Ireland* is yet infected therewith in ſeveral parts, ſo that it will not be loſt labour to treat therof, but a benefit to that Kingdom, as alſo to many of our *American Plantations*, where they frequent.

CHAP. XXI.

Concerning the Taking Wolves, Foxes, Badgers, Otters, *&c. by* Traps, Engines, *&c.*

WOLVES are a kind of *wild Dogs*, ſtrong and fierce; their Young are whelpt blind, and continue ſo for ſome time. When they have their Young they are very bold, and venture much for *Prey* for them; and when they are *Proud* they are the moſt fierce, inſomuch that they will moſt furiouſly fight with one another, and at ſuch times they are eaſily purſued and found out in their *Retreats*, and ſo may be ſhot.

There are ſome *Hounds*, and eſpecially the large *Iriſh Greyhounds*, which will run at them; but they ſhould always be laid on a clear *Wind* in divers places to aſſiſt each other, and the Men ought to be ready with *half Pikes* to aſſiſt them, and to kill the *Wolf* when he is ſtayed; for a *Wolfs* Biting is mortal to the *Dogs*.

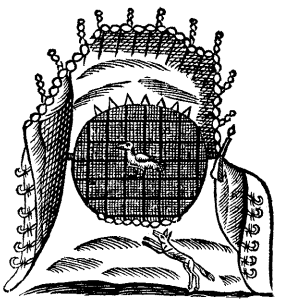
If you run at the *Wolf* with *Dogs*, it muſt be by Day; for in the Night their *Eyes* are ſo flaming and dreadful, that no *Dog* will venture on them.

A *Bloodhound* will draw after them very courageouſly, but not all *Hounds*; and there ought to be particular care in the Entring your *Dogs*, at the firſt Seaſon in *Auguſt* and *September*, whilſt they are young, to the end they may be brought on by degrees to encounter with Old ones.

There ought to be no *Law* given to ſuch *Beaſts* of Rapine, ſo that you may uſe *Guns*, *Bows*, or the like, to deſtroy them, taking all advantages of *Age*, *Sex*, or *Conditions*.

I forbear to give you any further Obſervations of the nature and quality of the *Wolf*, referring you to *Ariſtotle*, *Pliny*, *Geſner*, and others, that have written very ſtrange and fabulous things of them; but proceed to ſhew you ſome ways (beſides *hunting* them at force,) how to take them by *Gins*, *Nets*, *Traps*, and the like.

I ſhall preſent you with a kind of *Pit-fall*, which will require little or no explanation, it is ſo eaſie to be underſtood; this following *Figure* will deſcribe it unto you.



Be ſure your *Pit* be large and deep enough, and that your *Hurdle* be covered with *Turfs* or *Earth*; the *Hinges* on which it hangs, to be of a juſt *ballance*, that the *Hurdle* may turn and return upon the leaſt Motion; the *Artificial Hedge*, which you ſee made up of *Hurdles*, ſuch as are uſed for *Sheep-Pens*, may be broad at the entrance, and ſo growing narrower at the end, that the *Wolf*, *Fox*, or *Badger* may not paſs by the ſides; and on the other end of the *Trap* place a *Gooſe*, a *young Pig*, or the like: Make a *Train* of ſome *Carrion* to direct and draw the *Beaſts* to the ſaid *Trap*; and it may ſometimes ſo fall out, that you may take two or three in a Night in the ſame *Pit*. Be ſure therefore, that the *Trap* do exactly cover the *Hole*, to the end they may not diſcover one another.

Having once taken a *live Wolf*, you may diſable him from hurting the *Dogs* by breaking his *lower Jaws*, and then enter them at him, ſuffering them to kill him, and ſo *Reward* them.

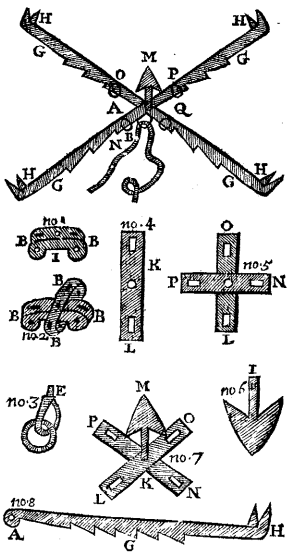
The beſt way to Bait the *Trap*, is to lay a *live Lamb* tyed by the four Feet juſt on the middle of the *Trap-Door*, and next to that a *Gooſe* nailed, with a *Lath* over her *Feet*; for theſe two *Creatures* being alone, do always call out for their Companions, and conſequently do draw on their Enemies ſo much the more eagerly; and a *Wolf* or *Fox* coming to jump on them is the more ſurely taken, than if you ſhould place your Bait at one end of the *Trap* upon the ground.

Now if you know where a *Wolf*, *Badger*, or the like, uſeth to paſs, you may boldly uſe this Device with good ſucceſs: But a *Fox* will be too cunning, for it is in his nature to return whenever he meets with any new contrivances in his *Roads*, and will not adventure for ſome time, taking his circumference by other ways.

The two former ways for *Baiting* your *Trap* are very good, but I ſhall ſhew you one more that excels them; *viz.* Make your *Trains*, and always draw your *Train* over the *Trap*, and then hang the ſaid *Train-Carrion* on ſome *Bough*, which butterth juſt over the *Trap*, ſo that nothing may come to reach it but by firſt ſtanding on the *Trap*, and ſo you will be ſure of them.

Theſe kind of *Traps* ought not to ſtand covered by *Day*, for fear of *Cattle* falling into them.

I ſhall next deſcribe unto you an *Iron Engine* for the taking them, very eaſie to be made. This *Figure* ſheweth its form.



The uſe and explanation of this *Engine* is as followeth; and for the better comprehenſion thereof, the ſeveral pieces are ſet down apart that go to the compoſure of the whole, with the ſeveral Numbers over them.

Firſt, Get two pieces of *Iron* as *No.* 1. each two *Inches* and an half long, one broad, and a quarter of an *Inch* thick; theſe two pieces muſt have *Supporters* at each end, as you ſee *B.* and pierced through to receive an *Iron-Peg*. You muſt place athwart over one another, as *No.* 2. riveted in the middle with a piece of *Iron*, as *E*, an *Inch* long, with a Ring in the end of it, as *R* in *No.* 3.

In the next place, you muſt have two other pieces of *Iron*, as *No.* 4. ſix *Inches* long, one *Inch* broad, and the ſixth part of an *Inch* thick, which muſt be a little hollowed under, and at each end *L O* there muſt be an opening like a *Mortice* an *Inch* long, and about a third part of an *Inch* broad. Theſe two *Pieces* faſten in the middle thwart each other,

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other, as *No.5.* with an *Iron-Pin*, as *M I* in *No.6.* four or five *Inches* long, and made like a *Snakes Tongue*, ſo that that being thruſt into any piece of *Fleſh*, the *Fleſh* may not eaſily be gotten off; the end of the ſaid *Peg* or *Pin I* muſt be thruſt into the *Hole K*, to hold the ſaid two pieces fixed like a *Croſs*, as *No.7.*

The next thing to be done, is to prepare four pieces of *Iron*, as *No.* 8. each eighteen *Inches* long, and about a quarter of an *Inch* ſquare, unleſs it be towards the middle *C*, where they muſt be ſomewhat thicker, that is, almoſt half an *Inch* thick, and not ſquare, but only where the *Teeth* are. The end marked *A*, ſhould be rounded with a ſingle *Supporter*, pierced through in the middle; and the other end *H* ſhould be like a *Fork*, with a crooked Back about two *Inches*, as deſcribed.

All theſe *Pieces* being thus prepared, begin to compoſe the whole *Engine* by *No.1.* placing them croſs-ways, and the end of the *Peg E* into the *Hole I*, that they may not ſtir. Then take a piece of *Iron M I*, *No.6.* force the end *I* into the Hole *K*, of each piece *P N O L*, fixing it very faſt that nothing may give way. The *No.7.* ſheweth them altogether. Then take *No.8.* and put the end *A* into the *Mortice* or opening *N*, and then into one of the *Supporters B* of *No.3.* and there faſten it with an *Iron Peg* that it may play in and out, and turn like a *Caſement* on its *Hinges*. Alſo do the ſame with the three other of the ſame pieces, placing the crooked *Forks* upwards, as in the three *Figures* which repreſents the whole ready Set.

Your *Engine* being thus prepared, carry it where you find any *Carrion* laid, and about fifty or ſixty Paces from the ſaid *Carrion* ſet your *Engine*, and faſten it with a *Stake*, or *Iron-Peg*, to the ground, and if it might be, place it in the midſt of ſome *High-way*, or *Foot-path*; or for want of ſuch a conveniency in ſome ſmooth even place, beat up the *Earth* the whole circumference of the *Engine*, ſo that the middle may be half a *Foot* deep, like a ſquare Bed; juſt in the middle drive in your *Stake* or *Iron-Peg*, which muſt have a *head* or *round knob*, that you may faſten thereto the *Cord B*, which holds the whole *Engine*.

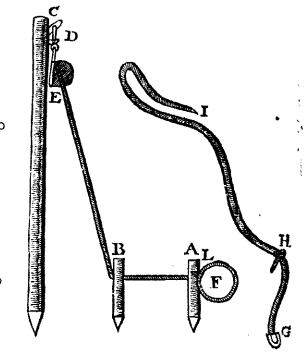
Then cut a pretty big piece of *Carrion*, and faſten it to ſome *Stick* or *Rope* of *Hay*, and drag it up and down to and fro your *Engine* or *Trap* at a good diſtance, and then clap it upon your piece of *Iron M*, having firſt rubbed over therewith the whole *Engine*, *Rope*, *Stake*, and all that the *Beaſts* may not ſmell your deſign. (But it is held better, that you make your *Train* to and from your *Carrion*, and not your *Engine*; and that you placed your *Train Carrion* with the reſt of the *Carrion*, and baited your *Engine* with a freſh piece) you muſt then pitch up a Stick juſt over your *Carrion*, with a piece of *white Paper* on the top of it, to the end you may frighten the *Beaſts* from approaching it; for they will not preſume to come very near it, but will ſurround it at a diſtance on every ſide, and at length fall in with your *Engine*, and coming with fury to ſeize on the *Bait*, the four *Crooks* or *Forks H* will ſeize on him, and the more he ſtrives, the faſter he will be.

If you place three or four about a piece of *Carrion*, you can't well miſs of your deſign; and that the *Carrion* may be preſerved the longer, take care that no *Dogs*, *Crows*, or the like, come to it.

The *Badger* is not very clear *ſighted*, nor good *ſcented*, ſo that there is no great skill required in taking him, a ſmall blow on the *Head* betwixt the *Eyes* knocks him down.

The *Otter* is ſaid conſtantly to uſe his wonted Road, and can hardly be put by it, ſhould you make a *Hedge* thwart their Walks. But on the contrary, the *Fox*, if he find any new thing, or any alteration in his accuſtomary *Road*, he preſently retires upon his ſteps, being jealous of a Surprizal.

I ſhall preſent you with a Device for the taking a *Badger*, but not a *Fox*, as being too fearful and ſhy.



Provide a *Stick*, as the letter *A*, about the bigneſs of a *Threſhing-Flail*, with a Hole about four *Inches* diſtant from the great end *A*, and your *Stick* muſt be ſharpned at the ſmall end. Then prepare another *Stick B*, which muſt be ſomewhat bigger, but of the ſame length with the other; This *Stick* muſt have a *Mortice* in it about four *Inches* from the great end *B*, which may play in and out, and receive a Pulley of *Wood*; and the ſmall end muſt be pointed. Likewiſe get a third Stick five foot long, and as big as a Mans *Arm*, pointed at one end, and forked at the other, or at leaſt Notched or Forked through to receive a *Peg* or a *Cord*. Then have a ſtrong treble twiſted *Cord*, about twenty *Foot* long, as marked *I H G*, at the end *G* you are to make a loop, through which paſs the other end *I*, and about two *Foot* off at *H* make a ſtay, either by tying a knot, or which is better by whipping a packthread four or five times about, and faſtning it there. Your *Cord* muſt have a *Buckle*, or *Ring* of *Iron*, or ſtrong Leather, as *D*, and that

that *Ring* or *Buckle* muſt have a ſecond *Cord*, about two Foot long, wherewith it may be faſtned at the Hole or fork of the *Stick G*.

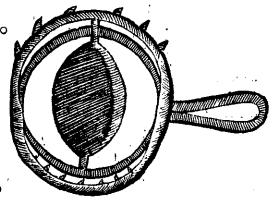
Theſe are the chief things you are to prepare, for 'tis ſuppoſed you may eaſily find a large *Stone* of about thirty pound Weight, which you are to uſe.

When you find that any *Badger* hath paſſed, either by his *Footing*, or leaving ſome of his *Hair* on the *Boughs* (which *Hairs* are whitiſh at both ends, and blackiſh in the midſt) you may there ſet up this *Engine*, which ſeldom fails of taking him in three or four days time. But obſerve that you ſet up the *Engine* juſt in the *Meſh* of the *Badger* (that is the Hole, or through-fair in the *Hedge*, by which he paſſes) and about the middle of the *Hedge* drive in your Stick *A* until the Hole be only eight or nine *Inches* above the Earth; and juſt over againſt him at about a Foot diſtance in your Stick *B*, ſo that the under part of the Pully be level with the Hole of your Stick *A*; ſet your third *Stick* about three *Foot* from your ſecond in the *Hedge*, and fix it ſtrong; at the upper end faſten your *Leather Buckle*, or *Iron Ring D*, then thruſt the end of the *Cord I*, through the top of the *Cord C*, next through the Hole in your Stick *A*, and then through the *Mortice* under the *Pully* of the Stick *B*; and laſtly through the *Leather*, or *Iron Ring D*; ſtrain the *end* of your *Cord I*, until the ſtay *H* be juſt at the *hole* of your Stick *A*, in which *hole* gently put a ſmall *Peg* about an *Inch* long, which may only keep the ſaid ſtay *H* from ſliping through the *hole*, then take your *Stone* or *Weight of Lead*, and lift it up to the *Buckle D*, and faſten it to your *Cord*, letting it hang there. Then open your *Collar F* juſt in the *Meſh*, that the *Badger* may not poſſibly get through at that place, unleſs he put his *Head* through the *Nooſe*. In caſe the *Meſh* be large, and that the *Nooſe* will not ſtand up extended, you may tye it at both ſides with a few Spires of *Graſs*; and if the *Meſh* be high, ſupport your *Nooſe* with a little *Fork* as *K*. You may try when all is right, for the leaſt twitch of your *Nooſe* will thence force out the *Peg L*, and make way for the ſtay *H*, then falls the *Stone E*, and ſtrangles the *Badger*.

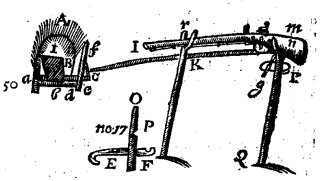
In caſe you perceive that a *Badger* uſeth to croſs any High-way, or to frequent any *Foot-Path*, make an *Artificial Hedge* croſs his walk, and leave a paſſage for him, in which you may plant your *Engine*; for he will endeavour to get through, rather than return or walk about.

Your *Ironmongers* ſell certain *Engines*, which they know not the uſe of; there is much Art and Caution to be obſerved in planting them as they ſhould be; for one well planted is better than ten ſet at adventure and indiſcreetly. I ſhall not trouble you with the manner of compoſing them, becauſe they are every where to be bought, nor how to open them, that being known to moſt; but I ſhall give you ſome Inſtructions how to ſet them to Art. When you have found out the tracking of any *Fox* or *Badger*, place your *Gin* in this manner; Dig up a ſquare plot of Ground, and bruiſe the Earth to fine Duſt, that it may lye ſmooth and plain; the midſt of it muſt be deeper and hollower, to the end the *Bridge* may have Room to play when the *Beaſt* treads on it.

Place your *Gin* croſs the way, by which the *Vermin* uſeth to paſs; and cover over the whole plot with *Graſs*, or *Leaves* gently ſtrewed, that the *Beaſt* may not ſuſpect any thing; if you did the like in two or three places, by which he uſeth to paſs, he would go over the more boldly. It is not amiſs to make a *Train* of ſome *Carion*, to draw him on the more boldly. You may tye the end of the *Chain* to ſome *Stake*, removed about four or five *Foot* from the *Gin*; and when you are making it, let the Soles of your *Shoes* be rub'd over with ſome *Carion*, that the *Beaſt* may not perceive you have been there. This following Figure *ſhews* the Form thereof.



There is great Art to be uſed in drawing on all *Beaſts* of the *Foreſt*, as being by nature jealous and fearful, ſo that your Art muſt be to work your Devices with Subtilty. Therefore wherever you find a *Beaſt* hath paſt, lay ſome *Baits* for him three or four days one after another; and if you find them ſtill eaten, you may aſſure your ſelf of taking him; but plant not your *Engine* all at once, but firſt make your place ready, then let him eat out of it once or twice, then let your *Engine* lye there a day or two, and if he ſtill continues eating the *Baits*, then fit it up for the taking him.



This Invention ſheweth how to ſhoot a *Fox*, *Woolf*, *Badger*, or other *Beaſt*, if once you know the place by which they paſs, or the *Earths* where they Retreat by day, which are generally in ſtrong *Thickets*, and amongſt *Rocks* that can't be dug; nor are theſe *Beaſts* to be gotten out by force, therefore this Invention will be good to take them. Suppoſe the Letters *A B* were the *Hole*, by which they enter, drive in a Stake half a Foot long, juſt in the Mouth of the entrance,

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trance, and another at *d f*, as big as ones *Thumb*, and about a *Foot* long on the other side, within two *Inches* of the Hole; this Stick at the end *F* muſt have a little Notch, as *F*, which muſt be four *Inches* out of the Ground, than have a Stick *b e c*, which muſt be four *Fingers* longer than the ſpace between the two firſt *Sticks b A*; at one end *a* muſt be a little Crook, and at the other end *e* a ſmall Notch; 'tis deſcribed in the *Figure No.* 17. marked *E F*. So is the great Stake by the Letters *O P*, with the Notch at the part *P*.

Then look out for a convenient place, to ſtand about ten or twelve paces from the *hole*, to make a Shoot directly into it, without the interruption of any *Boughs*, *Buſhes* or the like, as for Example at *G Q*, and there faſten a luſty Stake, about four or five Foot long into the *Earth*, with a *Head* like a *Reſt*, and about three or four *Foot* near the Hole, drive in juſt ſuch another *Stake*, but ſomwhat ſhorter. Then place your *Gun L R M*, upon your two *Reſts* or *Stakes*, and level it directly with the Hole, then bind it very faſt to the *Stakes*, to that it may directly hit the middle of the Entrance. Your *Gun* being thus fixed according to *Art*, get a ſmall but ſtrong *Cord*, which draw on the forked places of the *Stakes* juſt under the *Gun*; at the end *P* tye a *Stone* of ſeven or eight pound weight, and at the other end *f* a ſmall *Stick*, half as big as ones little *Finger*, and about two *Inches* long; ſtrain your *Cord* until the *Stone* be juſt at the *Tricker* of your *Gun*, and that the ſmall Stick may be put with one end into the Notch *e* of the Stick *a e c*, in ſuch manner that the ſaid *Stick* may be about an *Inch* clear off the Ground, the *Stone* holding all right; Then place a ſmall thin *Board*, about eight or nine *Inches* long, and half ſo broad over your little *Stick*, and cover it with dry *Leaves*, *light Duſt* or *Graſs*, then cock your *Gun*, and faſten to the *Tricker* one end of a little *Packthread*, the other end whereof muſt be drawn through the Reſt *P*, and then tyed to the *Stone*, and your work is done.

For there is not any *Creature* which paſſeth in or out, but muſt tread on the *Board*, which cauſeth the ſmall Stick to give way, and then down falls the *Stone*, and off goes the *Gun*, which being well charged with *Piſtol Bullets*, cannot miſs Execution, unleſs it happens to *Rain*, and the Wet damps the *Powder* that it doth not Fire, and that may be remedied by making a Caſe of Wood to be over the *Lock*. By this means you may kill *Wolf*, *Fox*, or other *Creature*, if you can find out their *Retreats* or *Harbours*, or but their uſual *Paths* or *Roads*. You may alſo make *Trains* and lay a *Bait* juſt at the level of your *Gun*, at about twelve or fourteen Paces from it, all which I refer to your ingenuity, that I may not wear out the Thread of this Diſcourſe, and leave nothing to exerciſe your invention.

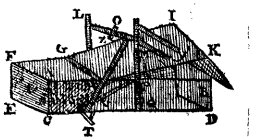
CHAP. XXII.

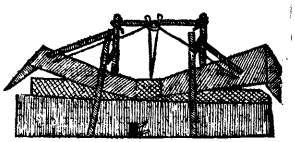
Directions for taking Polecats, Fichets, Martins, or Marterns, and the like Vermin that are injurious to Warrens, Dovehouſes, or Henrooſts.

Theſe *Creatures* are found very offenſive to ſuch places as they frequent, as *Warrens*, *Dovehouſes*, and *Henrooſts*, not only deſtroying the Young, but oft times devouring the *Egs*.

They are great Encreaſers, and if care be not taken to deſtroy them, they will do great and many miſchiefs. Here followeth a deviſe to take them by Night, for they are not often ſeen by day, but do either lye cloſe in their *Holes*, or in ſome concealed places as amongſt *Stones*, under *Logs*, and ſometimes on thick Boughs of *Trees*.

'Tis good that a *Warrener* do ſometimes look about in ſuch like places with a *Gun* to ſhoot them, and not altogether to truſt to his *Box*, or *Cheſt-Traps*, which are here repreſented unto you in theſe *Figures*. The firſt being with a ſingle, and the latter with a double Entrance.





I ſhall ſhew you how to make and uſe theſe *Traps*. Take three pieces of *Oak*, or *Elm Boards* of an equal bigneſs, like that which is in the firſt Figure, and marked with *A B C D*; let them be four foot long, and one over, and about an *Inch* thick; nail them together juſt like a *Coffin*, and cloſe up one end with a piece of the ſame *Boards*, which muſt be nailed faſt on, as *A C E F*. Likewiſe nail over three main *Boards*, another piece, as *A F G H*, which muſt be as large as any of the reſt, but not ſo long by two parts in three; and for the reſt of the covering you muſt have another piece of the ſame ſort of *Boards*. On the other ſide of the *Boards* make a Hole with a *Gimlet* at the places marked *G H*, where faſten two *Nails*, which may be driven into the *Board* that

that lies on the top, ſo as to ſerve for *Sockets*, or for your better comprehenſion as the *Axletree* of a *Coach*, ſo that the *Board* may be eaſily lifted up, and let down; and at the other end *I K*, nail another piece of *Timber* juſt equal to that marked with *A F G H*, which muſt only be faſtned to the upper *Board* in ſuch manner, that being let down, the whole may ſeem to be ſome *Cheſt* cloſe ſhut.

Then get two pieces of *Wood* as *L M P Q*, two *Foot* long, an *Inch* and an half thick, and pierced at the ends *L M*, with a Hole big enough to turn ones little *Finger* therein; then nail them on your two ſide *Boards* about the middle of them, juſt oppoſite to each other, with a piece of *Wood* an *Inch* Square, ſhaped at both ends like an *Axletree*, which put eaſily into the two Holes *L M*; At the middle *O* of this ſaid *Axletree* frame a *Mortice*, or *hole* to faſten and tye a Stick *O N*, which may fall down upon the moveing *Plank*, when it is let down; and this is intended to prevent any *Beaſt* from lifting up the *Cover*, when once it is down.

Before you nail all the *Boards* together, make a *hole* in that plank marked *A B C D*, at the place marked *v x*, which *hole* ſhould be two *Inches* long, and half an *Inch* over, juſt oppoſite thereunto; and in the other Plank bore a little *hole* with a *Gimlet* as at *R*, that you may put in a ſmall *Cord* there, at the end of which tye your *Tricker R S T*, made of a *Stick* as big as ones little *Finger*, which though faſtned at the end *R*, may however have liberty enough to move up and down, and muſt paſs thro ugh the Hole *V*, about two *Inches* out, with a Notch or two as *T*: about the end of it tye your *Bait* on this *Tricker* within the *Cheſt-Trap*, which ought to be appropriated to the Nature of the *Beaſt* or *Vermin* you intend to take. For a *Polecat* or *Fitchet* uſe a *Chicken*, for a *Weeſil* or *Martin*, *Egs*, and for a *Houſe-Cat* ſome ſmall *Birds*, or a *Pigeon*.

For the ſetting this *Trap*, you muſt have a ſtrong *Cord* faſtned upon the moving Plank, near the middle of it marked *Y* towards the end; at the other end of the ſaid *Cord* tye a ſmall Stick marked *V*, an *Inch* and an half long, and half as big as ones *Finger*; fotmed at one end like a *Wedge*, ſo that the *Trap* being lifted up about half a *Foot*, as you ſee it repreſented in the *Figure*; and the *Cord* being paſſed over the *Axletree Z O*, the little *Stick* may have one end in the Notch *T* of your *Tricker*, and the other end in the Hole *X*, and then is your *Trap* or *Engine* right as it ſhould be.

If your *Tricker* be but a quarter of an *Inch* clear from the bottom Plank, when any *Vermin* is once in, and gives but one touch to the *Bait*, which is on the *Tricker*, that gives away, and down falls your moving *Plank*, with the *Dore* faſt ſhut.

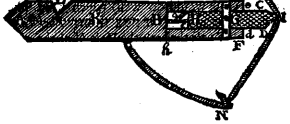
The other *Trap* with the double Entrance, is much the beſt, by reaſon that the *Vrmin* you intend to take, may ſee through it to behold the *Prey*, and come in at which ſide they pleaſe, and therefore will ſooner venture in.

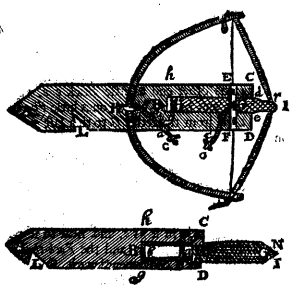
It is formed much after the ſame manner with the former, only it hath two turning *Planks*, and falling *Doors*, and the *Tricker* ought to be in the middle at *Z*. I need not give you further Directions therein, ſeeing you can't miſs the hitting this latter, if you have truly comprehended the former, it requiring nothing more than doubling the Inſtructions for the *Trap-Doors*, the *Sockets*, *Cords* and the like. Beſides every *Warrener* can either make them, or ſhew you them ready made, if in caſe you can't make one by theſe Directions.

CHAP. XXIII.

Directions for killing Field-Mice, and Rats.

I ſhall in this ſhort *Paragraph* give you a uſeful Invention for the killing *Field-Mice* and *Rats*, being great devourers of *Wall-Fruit*; and 'tis generally believed that *Birds* do the miſchief, when in truth 'tis the *Rats* by Night. They differ from *Houſe-Rats*, being grayer and longer *Haired*, their *Tails* are not ſo long, and have two thick *knobs* on them, full of buſhy *Hairs*; they are ſaid to ſleep about ſix Months of the year, *viz.* from *September* to *April*, and are often found in the *Roots* of old *Trees*, and the like places. Therefore theſe following *Figures* will ſhew a device to take them.





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I shall give some *Rules* and *Directions* for the *making, setting* and *baiting* the aforesaid *Traps* to the most advantage; observe the middle *Figure*, and by that you may regulate your self. Get a piece of *Pipe-staff* two *Foot* and an half long, and six *Inches* broad, then take a piece out of it from the pointed line *g, b*, about Ten *Inches* from the end *C, D*: then opening a pair of *Compasses* an *Inch* and an half, set one foot of the *Compasses* at the edge *g*, and carry the other foot over the line *g b*, to the point *q*, and from thence placing one foot of the *Compasses* at *D*, make one point or mark at the letter *c*, to draw a *line* from thence to *q*: Do the very same on the other part of the Board *C D H*, then with a fine *Saw* cut out your *Board* by the lines *c q*, and *d i*, and so take off the piece *G, H*.

When you have proceeded thus far, make a little kind of *Gutter* or *Channel* along the thickness of your *Board* with some small *Knife*, just where your piece was taken out, and nail a piece of strong Wood *E F*, about half an *Inch* broad over the two branches *C D*, to strengthen them, as likewise to hold the *Cord*, which is to bend and set the *Gin*, as shall be shewd in its proper place. Next cut a piece of *Pipe-staff* as *H C I*, a little bigger than your *excision*, and form it so that it may slip in and out by the *Gutters* or *Channels* which you have made in the thickness of the main piece from whence you cut the piece first mentioned.

This piece had need be three or four *Inches* longer than that which you cut out, and in the room thereof this latter must be placed, and the other end *I*, may be sloped to a point; and at the end of it bore a final Hole *n* thwart the *Board*, wherein put a strong well twisted *Cord*; you must likewise have a piece of *Holly* about three foot and an half long, as *M K N*, and as thick as ones *Finger*, (if it were of strong round *Wealchone* it would do well) which bend like a *Bow*, and at the end *M*, tie a strong *Pack-thread* which must pass through the Hole *N*, of the end *I*, of the moving piece *H G I*, and from thence tie it to the other end *N* of your *Rod* or *Holm*; then get three little pieces of Wood as *K I*, somewhat less than ones little *Finger*, and place them in the *Holes* made six *Inches* from the excision; then place the middle of your *Bow* upon your main piece of *Pipe-Staff* at the letter *K*, so that one of the three *Crooks* may be just at *K*, and the other two at *I, I*, and between them three your *Bow* must be held tight and firm; then tie a strong *Cord* at the Staff *E F*, at the Letter *I*, and at the other end a little Stick *c o*, two *Inches* long, and half so big as ones little *Finger*; the said *Cord* from the letter *G* to this last mentioned Stick must not exceed six *Inches* in length. You must have another little Stick *f c*, eight *Inches* long, but no bigger than the former, which tie with a *Cord* at the middle of your *Bow K*, in such manner that it may turn to which side you please, and the other end of the said *Stick* must have a Notch made in it as *c*, and near to it tie your *Bait*. The *Stick f c*, and the *Pack-thread c o c*, must be of a convenient length, so as the piece of Wood, *H G I*, being drawn and stayd by the little Stick *o c*, whereof the end *o* must be placed against the end *H*, and the other end *e* into the Notch of the Stick *f c*, and so it makes up a kind of Window, or entrance about the bigness of two *Inches* and an half, or three *Inches*, as is represented by the Letters *a, o, c*, in the second *Figure*. The *Bow M, K, N*, must be so bent, that when it is drawn as you see in the first *Figure*, the ends *M, N*, may be in a direct *line* with your strengthning piece *E, F*. The first of the *Figures* is to shew the form of the main piece, as likwise the runing one. The end *A* of the main piece must be sharpned to the intent you may either set it against the *Wall*, or on the ground, when you bend it; and about eight *Inches* from the end *A*, at the letter *L* you may cut in a pretty deep Notch whereon to rest your Foot, that you may hold it the stedlier when you go about to bend your *Engine*.

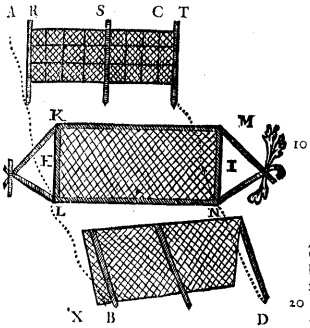
I shall now shew you how to *Bait* it, and where to set it up. You must *Bait* before you bend: A little piece of *Lard*, a *Candles* end, or the like will do the work, which fasten to the Stick *f, c*, about an *Inch* from the *Notch c*, just at the place marked with the letter *a*. Then set the end *A* to the ground, rest your *Foot* on the Noteh *L*, take with one hand the end *I* of the moving piece, and strain it until the end *A* be three *Inches* or thereabouts distant from *B*; then take in the other hand the little Stick *o c*, and place the end thereof *o* just against the end *H* of the moving piece, and then place the end *c* of the little Stick *o c*, in the Notch thereof *c*, and so the *Bow* is bent as it should be. Now for the setting or placing it, observe where the Fruit is most eaten, and there place the *Trap* or *Gin* in this manner. Thrust the end *A* into any Hole of the *Wall*, it matters not how little way it enters, provided it stand firm, the *Bow* being undermost, that so the *Vermin* may go along upon it by the pointed Line *A K B*, to seize on the *Bait a* by the opening *a, o, c*; and being on the *Board B*, he will stretch out his *Head* and *Legs* to reach it, and of necessity will force the little Stick *o c*, from the Notch *c* of the *Tricker*; then down goes the *Bow* and forces on the moving piece, so that the *Rat* is taken by the midst of his body. Be careful of setting this *Gin* that there be no *Bough* adjoyning; for then by the help thereof the *Rat* may get off the *Bait*, and not come upon the *Gin*, This Device is also good for *House-Rats*.

CHAP. XXIV.

How to take Hares and Rabets by Nets, &c.

I shall next proceed to shew you several ways how to take *Hares* and *Coneys*, and so conclude this Discourse of *Hunting*; first giving you some *Figures*, and then give you Directions for the ordering them for use.

These



These *Nets* are proper either for *Hares* or *Rabets*, but they must be placed as hereafter followeth. Observe the *Path* or *Tract* in any *Copice* or *Furrow* by which any *Hare* useth to pass, likewise how the Wind is, that you may so set the *Net* that the *Hare* and *Wind* may come together. If the *Wind* be side-ways it may do well enough; but never if the *Wind* blow over the *Net* into the *Hares face*, for he will scent both it and you at a great distance. The two pointed *Lines A. B. C. D* denote the Foot-path by which the *Game* useth to pass; then prepare three or more *Stakes*, according to the length of your *Net*; the *Stakes* should be about the bigness of ones *Thumb*, and about four foot long, sharpned at the greater end, and a little crooked at the smaller *R. S. T.* Stick them in the ground somewhat flooping, as if so forced by the Wind; two of them must be set at the two sides of the way and the rest in the midst as you see occasion. They must only hold up the *Net* from falling, but in a very slight manner, that if the *Game* run against it, it may fall down, and so entangle him. Be sure to hide your self in some *Ditch* or *Bush*, behind some *Tree*, or in such like place behind the *Net*, for if you should be perceived your expectation would be frustrated; nor indeed should you walk in the *Path-way* by which you expect the *Game* to come, for they will have some imperfect *scent* of you. When you perceive the *Game* to be past you, give a Shout, flinging your *Hat* at them, which will put them into such a surprize, that they will spring on, and run just into the *Net*, so that you must be nimble to take them, lest they break out and make their escape. This *Net* is not so good in windy Weather as in *Calm*.

The middlemost of the three *Figures* I shall next explain. It must beset much after the same manner as the former, as to the *Way* and *Wind*. You see how the two *Cords* at each end of the *Net* ought to be disposed; next you must have two Sticks *K, L, M, N*, each four foot long, and thrice as big as ones *Thumb*, they must be cut exactly smooth at each end, and placed in this manner; Take the *Stick K, L*, and put it on the edge of the Way upon the *Cord L*, which is at the bottom of the *Net*; The other *Cord* must be placed on the top of the Stick; then go along behind the *Net*, supporting it with your hand, and place your second Stick just as you did the first; you should endeavour to let your *Net* lean a little towards the way by which you expect your *Game* will come, for the *Game* runing fiercely against the *Net*, will force the *Sticks* to give way, and so the *Net* falls on him.

There is another *Net* represented by the last *Figure*, which is less troublesom than either of the former, only it may be further discerned; however it is excellent for *Rabets* in such *Foot-paths*, where sometimes you have three or four Couple runing after one another, all which may be taken at once, for it doth not fall as the two former.

The two former are useful for taking *Wolves*, *Foxes*, *Badgers*, and *Polecats*, as well as *Hares* and *Coneys*; but the latter only for *Hares* and *Coneys*. The true time to set these *Nets* is at Day-break, until half an hour before Sun-rise; and from about half an hour before Sun-set, until Dark-night.

I shall forbear to instruct you further in the setting this last *Net*, the representing it, together with the preceding *Rules* being sufficient, only this is of another make, and indeed a *Net* inclosed within two others.

There are three or four other ways to take both *Hares* and *Coneys* with *Nets* at any time of the day, especially if you know any *Furz-Bushes* or strong *Thickets*, where they use to resort. I shall not need to trouble you with the *Forms* of the *Nets*, only the *Names* shall suffice. You must observe which way in probability the *Hare* will take, and at twelve or fourteen Paces distance, pitch your *Net* in a *Semicircle*; then fetch a compass about and beat the *Bush*, and you can't well miss; for *Rabets* will make to their *Burrows*, and *Hares* to the *Coverts*.

The *Nets* that are of use for this purpose are called *Hays*, and are common to be bought at any Shop that sells *Nets*; you may have them longer or shorter as you think fit, about fifteen or twenty *Fathom* is a good length, and for depth a *Fathom*.

Rabets do often straggle abroad about Midday for fresh *Grass*; when you perceive any store to be gone forth to some remote *Brakes* or *Thickets*, get one with you, and pitch two or three of these *Hays* about their *Burrows*, and lie close there. In case you have not *Nets* enough to enclose all their *Burrows*, you may stop some with *Stones*, *Bushes*, or the like; then go with your *Coney-Dog* to hunt up and, down at a good distance, beating the *Bushes*, and drawing on by degrees, and the Man that is with you, which lieth close by the *Hay*, may take them as they *bolt* into the *Hay*.

Your *Purse-Nets* are very useful to take both *Hares* and *Rabets* at certain times, but you must watch them, else they will soon bite through and escape; they are to be placed in their *Mesbes* through *Hedges*, and in their *Burrows* or *Holes*.

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Thefe *Purfe-Nets* are alſo well known, and common to be bought in Shops that ſell *Nets*. Three or four Dozen of theſe *Nets* are ſufficient to lay over the *Holes*, and be ſure to faſten them by tying the Strings to ſome *Sticks* thruſt into the *Earth*, otherwiſe when the *Rabets* bolt out, they will run away, and get out of the *Nets*.

When your *Purſe-Nets* are all fixed, and every thing in order, there muſt be one or two to lie cloſe to ſee what *Game* comes home, whilſt in the mean time you beat the *Buſhes*, and *hunting* at a diſtance to force them home; and if in caſe you have not *Purſe-Nets* enough to lay over all the *Berries*, then ſtop thoſe that remain with *Earth*, *Buſhes*, or the like, to keep them out.

There is another way to take *Rabets* with theſe *Purſe-Nets*, and that is at their coming out of their *Berries*, and you muſt *Feret* them out in this manner; firſt, hunt up and down to force them all in; then ſpread your *Nets* over the *Burrows*, and ſo put in your *Feret*, or *Ferets*, with a *Bell* about their *Necks*, which will give notice of their coming to the *Rabets*, who endeavouring to avoid the *Ferets* will bolt out into the *Purſe-Nets*; from whence you muſt immediately take them, before the *Ferets* ſeize them, and when they come out of the *Burrows*, put them in again. You muſt *Cope* their *Mouths*, that is, tye up their *Chaps* with ſome fine *Packthread*, which will hinder their ſeizing on the *Rabets*, and ſucking their *Blood*; for when their *Bellies* are full, they will lie in their *Burrows* and ſleep, ſo that you may wait above half a day before they will come forth, ſo that your Sport will be ſpoiled.

Some uſe to ſhoot a *Gun* into the *Berries* to awaken them; but I hold not that a good way, for it will terrifie the *Rabets*, and occaſion them to forſake the *Berries*.

You ought not to deſtroy too many *Does*, but of the old *Bucks* the more the better.

The *Hay*, as well as the *Purſe-Nets*, muſt be made uſe of with your *Ferets*; for if they eſcape the *Purſe-Nets*, then they are taken in the *Hay*.

For the keeping your *Ferets* obſerve theſe few Directions; Let them be lodged in ſome *Hutch* or *Hutches*, or for want thereof in *Tubs*, with clean *Straw*, which ought to be ſhifted every three or four *Days*; give them every Morning and Evening ſome warm *Milk* from the *Cow*, and for want thereof, ſometimes a warm *Egg*, the *white* and *yolk* being beaten together. You may ſometimes Reward them when they *hunt*, with the *Eye*, or ſome part of a *Rabet*. You muſt carry your *Ferets* in *Bags*, and ſo carry them home again; alſo feed them with *Sheeps-Hearts* and raw *Fleſh*.

As to the taking *Hares* and *Coneys* with *Slipping-Knots*, *Collars*, or the like *Nooſes*, although the ways are common to many, yet I ſhall ſpeak ſomething of them.

In ſetting theſe *Runing-Knots* rub them over, as alſo your *Hands* and the Soles of your *Shoes*, with ſome of the *Croſels* of a *Hare*, or with ſome *green Wheat*, or the like; for they are of ſo quick a *ſmell*, that you will elſe be diſcovered.

In planting your *Collar*, make the leaſt alteration imaginable; for old *Hares* are as ſubtle and jealous as *Foxes*, and their cuſtom is when they come to any *Hedge* through which they uſe to paſs, to ſcrape with their *Fore-feet* round about the *Meſh*, both before and in it, ere they will adventure through, ſo that you ſhall often find your *Knot* ſlipt aſide and drawn, which you will hardly believe; yet Experience hath demonſtrated it in the ſame place fifteen or twenty days together, ſo that for the greater ſecurity, it will not be amiſs to plant a ſecond *Runing-Knot* flat on the ground, juſt under that which you ſpread abroad, by which means you may take the *Hare* by the hinder parts. This ſecond is intended to ſurprize him by the *Foot*, and one or the other will hardly fail.

It is the nature of the *Hare*, being once taken in any of theſe *Knots*, to pull with all his ſtrength, and he ſeldom or never turns about like the *Rabet*, to bite off the *hold faſt*; you ſhould therefore uſe *Latin-wier* double twiſted, which will be ſure to hold either *Hare* or *Rabet*, or elſe as this *Figure* directs.

Take a little *Stake T*, twice as big as ones *Thumb*, and about a *Foot* long; at the upper end *S*, make a Hole big enough to receive the Tip of ones *Little-finger*; then make your *Collar* of ſtrong *Packthread* or *Wier*; if of the latter, tye the end of it to any ſtrong *Packthread*, which draw through the Hole of the *Stake*, and faſten it to ſome ſtrong *Bough*, which you muſt bend down towards the *Stake*; then put a ſhort *Peg* of about an *Inch* long, and ſomewhat leſs than ones *Little-finger* very gently into the Hole *S*, ſo that the Branch being let go may not ſlip your *Knot*, but may ſtand bent. Then open your *Collar R* to the largeneſs of the *Meſh*, and if any *Rabet* or *Hare* be taken, and they turn about to bite off their Chain, they preſently rub out the little *Peg*, then the *Bough* flies back and ſtrangles it. This is an excellent way to take any *Vermin*.

I ſhould now proceed to ſhew you ſeveral ways to take *Deer*, both with *Toyls* or *Nets*, and without, as alſo the manner of making them; but I forbear, leſt I ſhould be thought to teach the Art of ſtealing *Veniſon*; *Cuſtom* and the *Laws* having ſo prevailed amongſt us, as to diſcountenance all ways of taking them, but by hunting them with *Dogs*.

I ſhall next proceed to ſome few Obſervations about *Parks*, and ſo conclude this Diſcourſe of *Hunting*, with the *Laws* relating thereunto, as alſo to *Foreſts*.

CHAP. XXV.

Of PARKS and WARRENS.

PARKS and *WARRENS* may not improperly be termed the *Nurſeries* and *Storehouſes* of *Game*, as being always furniſhed with *Deer*, *Hares*, and *Coneys*, and generally with *Pheaſants*, and other winged *Fowl*. The firſt *Roman* that we read of that incloſed *wild Beaſts*, was *Fulvius Herpinus*; and *Varro* had the firſt *Hare-Warren*.

As concerning the Scituation of a *Park*, I ſhall let you know wherein the beauty and advantages do conſiſt; not that every place can afford ſuch a ground; however he that can't have all the conveniences and benefits, ſhould get as many of them as the place will afford, not loſing any, and not to follow the Foot-ſteps of ſome, who for want of due circumſpection and mature conſultation, have altered the frame of a Building two or three times before they have finiſhed it, to their great loſs and diſcredit.

A *Park* ſhould have three ſorts of Land in it, *viz. Mountainous* and *Barren*, *Hilly* and yet *Fertile*, *Plains* and *Fruitful*: The *Mountainous part* ſhould be well covered with high *Woods*, at leaſt a third part thereof; the *Downs* and *Hilly part*, ſhould have one third part *Coppices* and low *Woods*; and the *Plains*, at leaſt one third part *Meadows*, with ſome *Arable* for *Corn*. A *Park* ſhould not want a *River* to run through ſome part of it; alſo it ought to have a ſmall *Brook* or *Springs*; but if *Nature* denies theſe Conveniences, *Art* muſt ſupply it by *Ponds*, made to receive and preſerve *Rain* which falls; and ſuch *Ponds* will be very profitable for *Fiſh* and *Fowl*, in ſome of which may be made a *Decoy*.

You ſhould have your *Park* well ſtored with *Maſt-Trees*, as *Oaks*, *Beech*, and *Cheſnut*, which are not difficult to be had, and are quick of growth, eſpecially the two laſt, and they exceed the former alſo in ſweetneſs and goodneſs; neither ſhould *Apple*, *Pear*, and *Plumb Trees* be wanting, all affording good *food* for them. You ſhould alſo have your *Park* well incloſed, if poſſible, with a *Brick* or *Stone-Wall*; or for want with a *Pale* of ſound *Oak*, ſo high and cloſe joyned, that neither *Badger* or *Cat* can creep through, nor *Fox* nor *Wolf* leap over; and for a further defence it were not amiſs to have a good *Quick-ſet* Hedge, which ſhould be always kept in a good Husbandlike order. Some part of the *Mountain* and *High Wood* may afford a *Hernery*, and ſome part of the Midling-ground may be for a *Coney* or *Hare-Warren*. In the whole, you may breed young *Colts* and *Horſes*, nor is it amiſs that in ſome part of the lower Ground you have a *Cow-Walk* during the Summer Seaſon. There ſhould be at leaſt five or ſix *Incloſures* in your *Park*, that you may ſhut out and let in your *Deer*, as you ſee occaſion; ſometimes altogether into your *High Woods*, where in cold *Froſts* and *Snows* they may be ſheltered and fed by the *Keepers* with *Hay* and *Provender*. You may alſo in *Summer* let ſuch a proportion as you intend to uſe, be fed in better Ground than the others which are for Store. You ſhould alſo make artificial *Holes* and *Caverns* for the *Deer* to retire into, as well in the hot as cold Seaſons.

CHAP. XXVI.

Of Terms relating to Foreſts, and Foreſt-Laws.

A *Foreſt* is a place peculiarly ſet apart by *Royal* Authority for the keeping and preſerving of *Game*; and to that end there are certain peculiar *Laws*, *Officers* and *Orders*, many of which I ſhall here take notice if, and which may at large be found in the great *Charter* of the *Foreſt*.

A *Purlieu* is Ground adjoyning to *Foreſts*, which being made *Foreſts* by K. *Henry* the Second, *Richard* the Firſt, or K. *John*, were by perambulations granted by *Henry* the Third, and ſevered again from the ſame. And a *Purlieu-man* is he that hath ground within the ſaid *Purlieu*, and 40 s. *per Annum* Freehold; and ſuch a one may *hunt* within his *Purlieu*.

To every *Foreſt* doth belong certain *Officers*.

A *Regarder* is an *Officer* ſworn to take care of the *Vert* and *Veniſon*, to view and enquire of all Offences committed within the *Foreſt*, and of all concealments of them, and to ſee that *Officers* do well execute their *Office*; and of theſe *Regarders* there are more or leſs belonging to every *Foreſt* according to the largneſs thereof.

A *Foreſter* is an *Officer* ſworn to look after and preſerve the *Vert* and *Veniſon* within his *Bailiwick* or *Diviſion*, and to watch the ſame both by day and night, likewiſe to apprehend all Offenders, and to make complaint thereof to the *Foreſt Courts*.

A *Verderor* is an *Officer* choſen by the *Freeholders* of the *County*, by a *writ* directed to the *Sheriff* for that purpoſe, and is to look after the *Wood* and *Graſs* in the *Foreſts*, and of theſe there are alſo more or leſs according to the extent of the *Foreſt*.

A *Raunger* is to look after the *purlieu* and to drive back the *Deer* into the *Foreſt* and to enquire after *Offenders*, and to preſent their *Offences*.

An *Agiſtor* is an *Officer* that takes in to feed Strangers *Cattle*, and receives for the *Kings* uſe all ſuch *Tackmony* as becoms due for the ſame.

A *Chaſe* is much of the Nature of a *Foreſt*, being a place for the keeping of *Game*, to which belongs alſo ſeveral the like *Officers*.

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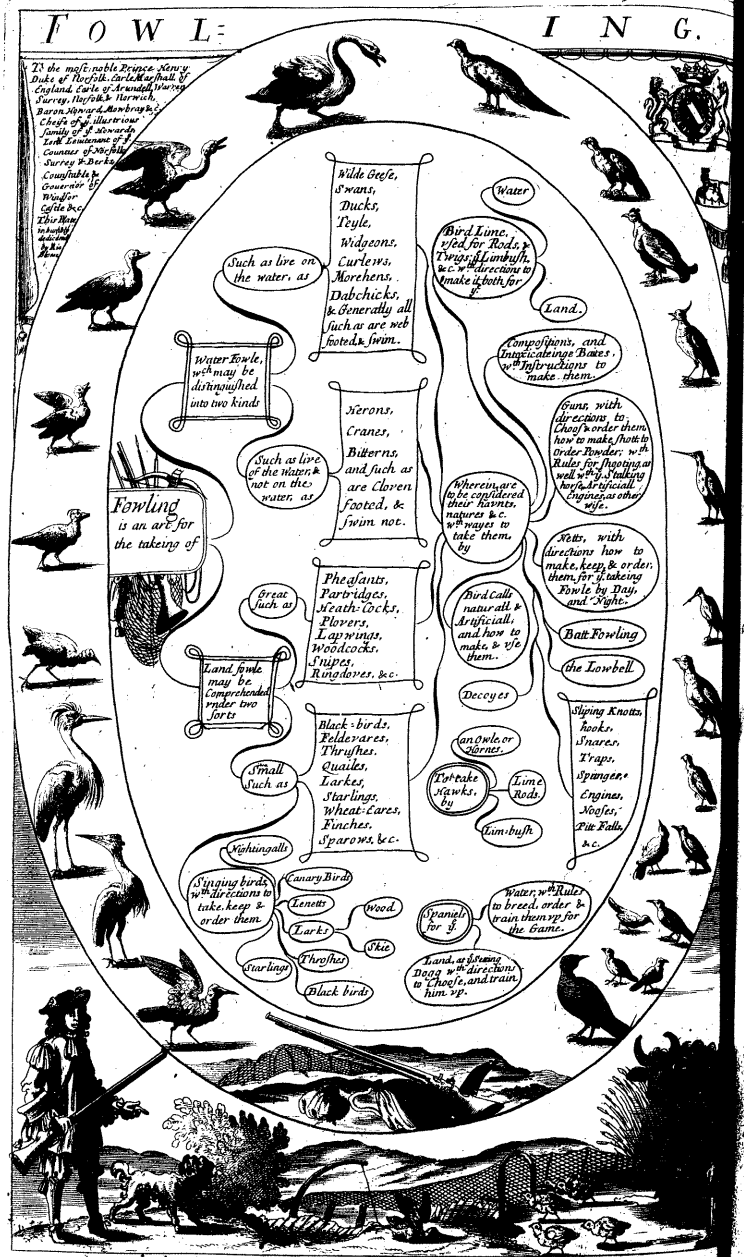
FOWLING.
To the most noble Prince Henry Duke of Norfolk Earle Marshall of England Earle of Arundell Warren Surrey Norfolk & Norwich, Baron Howard Mowbray &c. Chief of y illustrious family of y Howards Lord Lieutenant of y Counties of Norfolk Surrey & Sussex Constable & Governor of Windsor Castle &c. This Piece is humbly dedicated by his Graces
Fowling is an art for the taking of
Such as live on the water, as
Wilde Geese, Swans, Ducks, Teyle, Widgeons, Curlews, Morehens, Dabchicks, & Generally all such as are web footed & swim.
Water Fowle, wch may be distinguished into two kinds
Such as live of the Water, & not on the water, as
Herons, Cranes, Bitterns, and such as are Cloven footed, & swim not.
Land fowle may be comprehended under two sorts
Great such as
Pheasants, Partridges, Heath-Cocks, Plovers, Lapwings, Woodcocks, Snipes, Ringdoves, &c.
Small Such as
Black-birds, Feldefares, Thrushes, Quailes, Larkes, Starlings, Wheat-Eares, Finches, Sparows, &c.
Nightingalls
Singing birds wth directions to take, keep & order them.
Canary Birds
Lenetts
Larks
Wood
Skie
Throstles
Starlings
Black birds
Water
Bird-Lime, used for Rods, & Twigs, & Limbush &c. wth directions to make it both for
Land.
Compositions, and Intoxicateinge Baites, wth Instructions to make them.
Guns, with directions to Chuse & order them, how to make shott & Order Powder; wth Rules for shooting, as well wth & without Stalking horse & Artificiall Engines, as other wise.
Wherein, are to be considered their haunts, natures &c. wth wayes to take them by
Netts, with directions how to make, keep & order them, for y taking Fowle by Day, and Night.
Bird Calls natural & Artificiall, and how to make & use them.
Batt Fowling
the Lowbell.
Decoyes
Sliping Knotts, hooks, Snares, Traps, Springes, Engines, Noosles, Pitt Falls, &c.
Tame Owles or Hernes.
Lime Rods.
Lim-bush.
To take Hawks, by
Spaniells for y.
Water, wth Rules to breed, order & train them up for the Game.
Land, or Setting Dogg wth directions to Choose, and train him up.

THE COMPLEAT ART OF FOWLING.

PART IV.

Containing great variety of Experimental Secrets, for the taking of all FOWL both by Land *and* Water; *by* Bird-Lime, Snares, Traps, Nets, Engines, Bird-Calls, Decoys, Intoxicating-Baits; *the* Fowling-Peece, Stalking-Horse, Setting-Dog, Spaniels, &c. *Illustrated with great variety of useful* Figures, *for the better Explanation thereof.*

CHAP. I.

The Introduction; Shewing what Fowling *is, with the nature of the several sorts of* Fowl; *Their* Haunts, &c.

FOWLING is an *Art* for the taking all manner of *Fowl*, either by Enticement or Enchantment; as *Calls*, *Intoxicating Baits*, or the like, or else by *Guns*, *Nets*, *Engines*, *Traps*, *Setting-Dogs*, &c.

Now forasmuch as the *Fowl* on which this *Art* depends are various, and indeed numerous, so that to run into all the Particularities would be Voluminous; therefore for the Practicioners ease and benefit, I shall comprize them under these two general Heads, *viz. Water-fowl* and *Land-fowl*.

Water-fowl may also be distinguished into two several kinds, that is, such that live of the *Water*, and upon the *Water*, by gathering much of their *food* from thence, and *Swiming* for the most part on the surface thereof; and such as live of the *Water*, but not upon the *Water*, as by the gathering of most of their *food* from thence, but not *Swiming* upon the same, more than wading with their long *Legs*, and diving with their long *Necks* for the getting their *food* therein.

Such as live on the *Water*, are *Wild-Geese*, *Swans*, *Mallards*, *Teyls*, *Curlues*, *Widgeons*, *Moor-Hens*, *Dabchicks*; and generally all such that are *Web-footed* and *Swim*. Those that live of the *Water*, and not on the *Water*, are *Herons*, *Cranes*, *Bitterns*, and any *Fowl* that hath his sustenance in the *Water*, and yet hath his *feet* Cloven, and *Swimeth* not. And there are some which may not improperly be termed *Amphibious*, as partaking of the *Land* as well as the *Water*; and such are the *Sea-Pies*, which are not *Web-footed*, and yet can *Swim*.

Land-fowl are properly those that have their sustenance and abode only on the *Land*; either in *Woods*, *Coverts*, *Enclosures*, *Vplands*, both Arable and Pasture; in *Marshy Grounds*, or by and near *Houses*, *Hedge-rows*, and *High-ways*; And those *Fowl* may be distinguished under the general name of *Fowl*; and such are *Pheasants*,

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Partridges, *Heath-Cocks*, *Plovers*, *Lapwings*, *Wood Cocks*, *Snipes*, *Ring-Doves*, &c. also small Birds, as *Quails*, *Blackbirds*, *Thrushes*, *Starlings*, *Larks*, *Wheat-Ears*, *Chawfinches*, *Sparrows*, with abundance of other sorts, too tedious to name.

Now for your better effecting the taking of the aforesaid *Fowl* and *Birds*, I shall first give you some Instructions how to know and find out their *haunts*; and then proceed to the several ways of taking them: But note, that by observation 'tis found, that *Water-fowl* are the subtilest of *Birds*, and have the greatest regard to their own safety; whence it is that they are compared to a well governed *Camp*, having Scouts on Land afar off, Courts of *Guard*, *Sentinels*, and such like watchful Officers, surrounding the Body, to give a speedy Alarm at any approach of seeming danger. And indeed, whosoever shall observe their manner of living shall find the same; for there will be always some straggling *Fowl* aloof of the main Body, which upon any suspicion of danger take Wing, and give notice to the rest; and it is the nature of *Water-fowl*, to fly in Flocks, loving Society. The like doth *Starlings*, *Feldfares*, *Ringdoves*, *Plovers*, *Lapwings*, *Daws*, &c.

Of the Haunts of Fowl.

THE greatest thing of moment for a *Fowler* to understand is the haunts of *Fowl*, and accordingly apply himself to take them. In order thereunto take notice, that all sorts of great *Fowl* that divide the *foot*, have their residence by the edge of *Shallow Rivers*, *Brooks*, *Rowlets*, and *Flashes* of *Water*, and these keep not in *flocks* together, but are single, or here and there a Couple together, which makes them difficult to be taken by *Engines*, or the like; but are the best flights for *River Hawks* that can be, especially the *Hern*, that takes the greatest delight in such like places, where he may wade and dive in for the getting of *Fish* for his sustenance. They also delight in low *Marshes*, *Sedgy*, and *Boggy Grounds*; likewise in the dry parts of drowned *Fens* that are overgrown with *Reeds*, *Rushes*, and *Sedges*; and in such places the *Bittern* naturally delights, as being a melancholy Fowl; they also delight in half drowned *Moors*, and in the Vales of *Heaths*, or *Downs*, that is sheltered with *Hedges*, *Bushes*, or *Trees*, where they may obscurely lurk.

For the lesser *Fowl*, and such as are *Web-footed*, they frequent those *Fenny* and *Moorish Grounds* that are continually overflown, where they may *swim* free from disturbance of *Man* or *Beast*; they also affect the main *Streams* and *Channels* of large *Rivers*, with swift and deep Currents; but the *Wild-Goose*, and the *Barnacle*, delight not in any *Water* above their Sounding; for when they can't come to the bottom to suck up the ouz or the fatness of the *Water*, they seek new places. They also greatly delight to feed on *green Winter-Corn*, especially where the *Lands* are low and drowned with *Water* wherein they may paddle and *bathe* after *feeding*.

The smaller *Fowl* do also delight to feed in drowned *Meadows*, *Moors*, and such like places; also upon *Plashes*, *Meers*, *Lakes*, and *Loughs*, which have the shelter of *Shrubs*, *Reeds*, and such like things for their preservation from danger.

As to the haunts of *Pheasants*, *Partridges*, *Woodcocks*, *Snipes*, *Quails*, and other *Land-fowl*, I shall speak of it when I treat of each in its proper place.

CHAP. II.

Directions for the making of Bird-Lime, *and* Lime-Twigs *or* Rods; *and how to apply them to use for the taking of Fowl and Birds.*

THE best Season for making of *Bird-Lime*, is between the tenth of *June* and the end of *July*, at which time the *Sap* is strongest and quickest in the *Bark*; but rather about *Midsummer Moon*: And then take the *Bark* of *Hollys*, put it into *fair Water*, and boyl it six or seven *hours*, and when it is so soft that you may pinch it through with your *fingers*, it is enough. Then take it off the Fire, peel away the Inner *white Rind*, which cast away, and the *green Bark* (which is for your use) lay in some damp and moist place, covering it over with green *Weeds*, and as they wither put fresh thereon; and thus do for about nine or ten *Days*, by which time the *Bark* or *Rind* will be all rotten, with a white *hoar* over it. Then put it in a *Mortar*, beat it very fine like *Green-Sawce*; then wash it very well in *Running-water*, to get out all the filth, making it into small *Balls*, the better to squeez out the filth with your *hands* in the *Water*. And to know when it is washt enough, it will swell in your Hands: and then keeping it still washing, it will fall a little, and be fine and white, which is a sign that 'tis enough.

Being thus washt, put it into a *Stone-Pot*, fill it about three parts, because it will work and swell, and keep it close covered to preserve it from the *Dust*: In three or four days it will have done working, and then keep it for use.

If you will have it for *Water-Lime* (which must be very strong) then after it hath done working, as aforesaid, take what quantity you please, put it into a *Skellet*, to which put the like quantity of *Venice Turpentine*, as also the like quantity of *Goose-Grease*, with about half a quarter of a Pint of *Aquavitæ*; let these boyl gently on the *fire*, keeping it always stirring; and to know when it is enough, have a Pail of clean *Water*, in which put *Half a Crown*; then put the Stick which you stir the *Bird-Lime* with down into the *Water* to the *Half-Crown*, and when it brings it up it is strong enough, so that you may take it off the Fire, and put it into a *Pot* or *Ports* for use.

This *Bird-Lime* will never *Freez*, and therefore in the extremity of *Frosty Weather* you may use it instead of the weaker for Land-*fowl* or *Birds*; And if for *Water-fowl*, to stick the *Twigs* in the *Banks*, and up and down the sides of the *Ponds* that about a handful of the *Twigs* be under Water, and if it toucheth but the *foot*, or the *feathers* of a *Fowl*, it will hold her.

Of Rods and Twigs.

THE next direction shall be touching your *Rods* and *Twigs*, which must be bigger or lesser according to the strength of the *Fowl* you design to take; and of all others, those of *Willow* are the best, as being the toughest. You must also be careful how to plant your *Twigs*; for example, for great *Fowl* they must be at least half a yard asunder, almost upright, but with their *Heads* inclining from the *River*, for no *Fowl* will come up against the *Rods*; and you cannot plant lets than two or three hundred in a place: In the morning early visit your *Rods* to see what *Fowl* are taken: and if none, then beat about the Banks of the *Rivers*, and the like places for about half a *Mile* compass, to force them to your *Rods*, if possible, against the next Night.

In large deep Ponds and broad *Rivers* where you cannot handsomly fix your *Rods*, you may use this Device; fasten two *Poles* on each side of the *River* one, and strain your *Cord*, which must be artificially daubed over with *Bird-Lime*, and let it remain a little above the Water: to facilitate which, tye at certain distances little Bundles of dry *Rushes*, or *Peafe-hawm* handsomly compacted: and this Device will not fail to take good store of *Fowl*, especially *Duck*, if any frequent the place; and two or three times a day; especially *Mornings*, *Noons* and *Evenings* see if any *Fowl* are taken.

To place Lime Rods for the Land for taking small and Great Fowl.

YOU may plant your *Lime-Twigs*, or *Rods* on the *Land*, especially in *Green Wheat* for *Pigeons* or *Partridges*; and if the Weather be hard, for *Wild Geese*: but if you plant for heavy great *Fowl*, your *Rods* or *Twigs* must be proportionable; and you ought to lie near hand concealed, that you may run in with your *Spaniel* on any occasion. *Hares* and *Conevs* may be also taken by this Device. You must place your *Rods* slope-wise, and the tops not above four or five inches from the Ground, at about half a Yard distance, and as it were in *Banks*.

The small and streight grownd *Twigs* cut from the *Willow-Boughs* are the best, and must be greater or smaller according to the *Fowl* you design to take, but not very big that they may be pliable and wind about the feathers of the *Fowl* they touch. These *Rods* or *Twigs* being thus prepared, let the upper part, or half, be daubed over with strong *Bird-Lime* which must be well melted by the *fire* and even laid on, that *Fowl* may not discern the *Bird-Lime*.

Being well acquainted with the *Haunts* and *Feedings* of *Fowl*, either before *Sun-Set*, or before *day*, go with your *Rods* to the said places, and there pin down a *Stale*, that is, a live *Fowl* of the same kind you design to take, but with liberty to flutter up and down at pleasure; then round about it within a *Foot* of each other, prick down your *Rods* slopewise in ranges, some one way, and some another, about a foot high; and the more *Rods* you have to stick down, the better success you will have. If you design to take *Pigeons* it were not amiss to have two or three of these *Stales* tied down; and near the said *Rods* scatter some grains of *Corn*, the better to intice them to the *Rods*. You must lie concealed, but in sight of the *Rods*, and you should have small *Strings* tied to the *Stales* runing along the *Ground* unto you, which by giving a twitch will cause them to stir; to that the other *Fowl* seeing, will light in amongst them, and if with conveniency not frightning away the others, you may take these that are entangled, if not, let them flutter and tumble amongst the *Rods*. For the better facilitating your Sport have a well taught *Spaniel*, that when any *Fowl* offers to get away, your *Dog* will bring them to you; for in *Flocks*, especially of *Pigeons*, there will be work enough for both.

It were convenient to keep some for *Stales* for the like occasion: And when your Sport is done, gather up your *Rods* or *Twigs*, bundle them up and keep them for further use; and thus you may do *Morning* and *Evening* during the Season of the Year.

To take small Water-Fowl with Lime-Rods.

THE aforesaid *Rods* may be used for taking *Water-fowl*, and then they must be trim'd, and fized out according to your use, and the depth of the *Water*; for the deeper it is the longer must your *Rods* be, and they must be trimmed with the strongest *Water-Lime*. For the placing these *Rods* stick them in the *Water* as you did those on the *Land* slopewise, and amongst your *Rods* here and there stake down a *Stale* or live *Fowl*, either *Mallard*, *Teyle* or *Widgeon*, as you can get; and place your *Rods* very thick, the better to take them. You need not watch your *Rods* as you do for *Land-fowl*, only visit them two or three times a *day*, as aforesaid, always having with you a good managed *Water-Spaniel* to find out those that are escaped with the *Twigs*, as for other uses.

For the taking of *Wild Geese* or *Barnacles*, which commonly feed and frequent together, their haunts must be found out: and their most certain place is upon *Green Winter-Corn* that is remote from *Houses*. Your *Rods* must be large for such great *Fowl*, and placed slopewise in Rows, about the *Water-furrows*, and in the midst, so that they cannot come to the *Water* without touching them. Let the *Rods* be of a dark colour, resembling the *Earth*, and you should be near hand to make in, for when any of them are taken they will flutter, and the rest will take Wing; and if any do endeavour to escape (not being throughly *Limed*)

your

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your *Spaniel* must retrive them whilst you take up those that are entangled.

To take small Birds by Lime-Twigs and the Lime-Bush.

FOr taking small *Birds* with *Twigs*, get up before *Day*, and go to their *Haunts*, and all along the *Hedges* place your *Lime-twigs*, some upright, some slopewise, and some cross, and at such thickness that the *Birds* cannot well pass in or out without being entangled. Having thus set the *Twigs* (which must be after the *Birds* are gon into the *Fields* to seek their *Breakfasts*) go into the *Cornfields*, or *Meadows* near adjoyning where they usually feed, and with a *Pole* beat or fright them up, and they will betake themselves to the *Hedges* for Sanctuary, and are so taken. This exploit is to be done about the *Spring*, in *Harvest*, and at the fall of the *Leaf*; also early in the *Morning* and about *Sun-set* before they go to roost.

For the better taking the *Birds* get an *Owl*, and tie him in some part of the top of the *Hedge*, and the *Birds* seeing it, will come to gaze upon it, and so will become ensnared.

LIME-BUSH.

THe *Lime-Bush* is esteemed a very good way to take *Birds*, which is thus done; Cut down an Arm, or chief *Bough* of any *bushy Tree*, whose *Twigs* are thick and long, yet smooth and streight, as the *Birch*, *Aspen*, *Popler* or *Willow*; then neatly cut off all the superfluous *Twigs*, and having your strong *Bird-Lime* well mixt and wrought together with *Capons* or *Goose grease*, warm and fit to work, daub over (of an equal thickness) the *Twigs* or *Branches* that are left within about four fingers of the bottom, but the *Body* and *Arms* must be free.

Your *Bush* being thus prepared and *Limed*, place it for the Spring season on some *Quickset* or dead *Hedge* near unto a *Towns* end, a *Farm yard* or the like; In *Summer* and *Harvest* in *Groves*, in *Hedges* near *Cornfields*, *Orchards*, *Flax*, *Hemp*, or *Rape-Lands*; and in Winter about *Barns*, *Stables*, and *Stacks* of *Corn*, where *Chaff* and *Corn* is scattered up and down.

Having set your *Bush* in any of the said places according to the Season of the Year, place your self convenciently near at hand, where you may lye concealed; and in this *Bush* you should have about half a dozen *Stales* fixed, whose *chirping* and *singing* will intice others to the *Bush*; and it were not amiss if you were expert in their *Notes* to imitate them, which practice and due observance will bring you unto; and for the effecting it, be provided with *Bird-calls* which are of several sorts, some being made of *Wood*, others of *Tin*, and others of *Horn*; also some of *Vellom*, and some of *Cane*, &c.

This *Bush* is also of excellent use in the *Winter* for taking *Feldefares*, which usually fly in great Flocks, and settle upon *Trees*; so that being provided with one or more of them which fasten upon *Trees*, and having fixed thereon some *Stales*, beat about the adjacent Grounds to raise them up, and when they espie the *Stales* they will light on the *Tree* and *Bushes* for Company, and so are taken.

These *Birds* do also resort unto *Hedges* for the *Haws*; so that it is good to fix your *Twigs* thick up and down in such *Hedges* with some *Stales*.

Also they use much *Marshy low Grounds* to get Worms; so that they may be taken with your *Lime-Twigs* set up and down slopewise as before directed.

How to take Woodcocks *and* Snipes *with Bird-Lime.*

IT is by observation found, that a Disease is half cured when found out: so likewise it is ease to ensnare any *Creature* or *Fowl*, if their nature is rightly understood, and what they delight in either for Food or Exercise. But these *Birds* are difficult to discover, lying close, and not resorting much together, especially in the Day.

The nature of the *Snipe* is to lye in Frosty-weather, when all *Plashes* are frozen, by the sides of *Rivers*, and always with their Heads up or down the Stream, and not thwart it; and for the finding them out, you must be expert in the knowledge of the colour of their Feathers.

The *Woodcock* doth usually lye on Banks by *Hedges* and *Ditches*, against the *Sun*; and note, that a Day after a Moonshiny-Night they will endure one to come better to find them, than after a Dark-Night, and the reason is, for that in Moonshiny-Nights they can see to feed, and will not be so still and watchful taking their rest.

Now for the taking them with *Bird-Lime*, you ought to be provided with about sixty or seventy Twigs, which must be exactly and smoothly *Limed*; and having found their haunts, which you may know by their Dung, which is generally in low *Plashy* places, and such as are subject to *Weeds*, and not frozen in Frosty-weather; and at such places set your *Twigs* more or less, as you think fit, at about a Yard distance one from the other, and let them stand slopeing, some one way, and some another. If you design to see the Sport, you must lye concealed. And if there be any other open place near to that where your *Twigs* are set, beat them up, or else set your *Twigs* also there.

'Tis said, that these *Birds* do put their *Bills* into the moist places of the *Earth* where they frequent, and so jogging and moving them about disturbs the *Worms*, and cause them to come up, and so they become their Prey.

How to take Pigeons, Rooks, *and* Crows, *upon new Plowed or Sown ground.*

TAke a good quantity of small *Lime-Twigs*, or strong *Wheaten-Straws* of a good length which must be well *Limed*; these lay up and down

down where they frequent, and they will soon be entangled therewith; and for the better drawing them to your *Twigs* or *Straws*, you may be provided with two or three *Pigeons* tyed to the ground amongst your *Twigs*.

Another way to take Pigeons, Rooks *or* Crows, *very pleasant.*

TAke some thick *Brown-Paper*, cut a Sheet into about 8 parts, and make them up like *Sugar-Loaves*, then *Lime* the inside of the *Paper* indifferent well three or four days before you intend to set them; then put into each *Paper*, towards the further end, two or three Grains of *Corn*, lay these *Papers* up and down the *Ground*, and as near as you can under some Clods of *Earth*, early in the *Morning* before they come to *feed*; for the quantity you may use your discretion, the more the better, about an hundred is indifferent. When they come to feed they will espy the *Corn*, and begin to peck them out by thrusting in their *Heads*; then are they hoodwinked, for they can't get it off by reason it sticks so close to their *Feathers*; when they find themselves thus served they take Wing, and will fly bolt-upright until they have spent themselves, and then come tumbling down to the delight of the Spectators.

If you use this Invention in *Plowing* time, instead of *Corn* you may put into the *Papers Worms*, which will do as well.

CHAP. III.

Compositions and Baits for Intoxicating of Fowl.

THere are several Artificial *Compositions* and *Baits* for *Intoxicating Fowl*, and yet without tainting or hurting their *flesh*, so that it is unfit to eat; some of them I shall mention.

Take a Peck, or a lesser quantity of *Wheat*, *Rye*, *Barley*, *Pease*, or *Tares*, to which put two or three handfuls of *Nux-vomica*, and boyl them in *Running-water* very well, until they are almost ready to burst; then take it off the *fire*, and when they are cold strew them upon the *Land* where you design to take the *Fowl*, and such that eat thereof will immediately be intoxicated, and lye as if dead, so that you may take them up at pleasure, provided you stay not too long (for the dizziness will not last long upon them, therefore be near at hand;) and it were not amiss to kill them presently and take out their Intrals, although there is no great danger in it.

As the greater sort of *Land-fowl* are thus taken, so may you take small *Birds*, only making this alteration, that instead of *Wheat*, *Pease*, or the like *Grain*, you use *Hemp-seed*, *Rape-seed*, or *Canary-seed*, but above all *Mustard-seed*.

If you approve not of *Nux vomica*, you may boil the said *Grains* or *Seeds* in the *Lees* of *Wine* (the stronger the better) as you did in the *Running-water*, and apply them to use as aforesaid, and it will work the same effect, being esteemed more wholsom, having nothing of that poysonous nature in it; but in an hour or two the Fumes will be perfectly wrought off.

Instead of boyling the said *Grains* or *Seeds* in the *Lees*, you may steep them therein; but then they will require longer time before they are sufficiently swoln and fit for use.

Or instead of *Nux-vomica*, or *Lees* of *Wine*, you may infuse the said *Grains* or *Seeds* in the Juice of *Hemlock*, mixing therein the *Seeds* of *Henbane* and *Poppy*, or either of them. These must stand two or three *days* infusing, before they are fit to strew on the Ground for use, as aforesaid.

Having shewed you how to take *Land-fowl*, it will be necessary to give you some Instructions to take *Water-fowl*, especially at such times as they range up and down to seek their *food* on the Land; for effecting of which,

Take the *Seeds*, *Leaves* and *Roots* of the Herb called *Bellenge*, and having cleansed them from all filth, put them into a *Vessel* of clean *Running-water*, and let them lye steeping therein at least twenty four *hours*, and then boil them in the said *Water* until it is almost consumed; then take it off the *fire*, let it cool, and scatter it in such places where the *Fowl* have their *haunts*; they will greedily eat it, so that they will become immediately intoxicated, and lie in a Trance as if dead; but you must watch them, for the Fumes will soon wear off.

Some do add to this Concoction the Powder of *Brimstone* boiled therein, which is very effectual.

For destroying *Crows*, *Ravens*, *Kytes*, and such like mischievous *Birds*, that are found injurious to *Warrens* and *Parks* for the killing *Coneys* and *Lambs*; as also *Chickens*: Take the *Garbage* or *Entrails* of any *Fowl*, or for want thereof of a *Pig* or *Rabet*; this *Garbage* steep in the *Lees* of *Wine* with *Nux-vomica*, and when it is well infused therein, cast it forth in such a place where these *Birds* use to prey, or resort, which must be very early in the *Morning*, or in the *Evening*; and having a place prepared to lye concealed in near at hand, you may take those that are Intoxicated by the eating a bit or two of the said *Garbage*.

Or instead of the *Garbage*, you may take little pieces of *flesh*, and thrust therein a small piece of *Nux-vomica*, closing the place that it may not be discerned, and scatter the said pieces up and down where their *haunts* are, and it will do the same effect.

Having shewed how to take *Fowl* and *Birds* by intoxicating *Baits*, I will give a Receipt how recover them, that they may be made Tame.

Take a small quantity of *Sallet Oyl*, more or less, according to the bigness of the *Fowl* or *Bird*, and drop it down its *Throat*; then chafe its *Head* with a little strong *Whitewine Vinegar*, and it will soon recover, and be perfectly well.

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To the Honourable Thomas Fairfax Esqr. eldest Son of ye
R.t Hon.bl (Henry Lord Fairfax of Denton in York-shire
This Plate is humbly Dedicated by Richard Blome.

it in good Order, and for that purpoſe obſerve theſe few directions. Keep it always in a Caſe either of *Wood* or *Cloth*, in a dry place; for the Damp ſpoils and ruſts it. Let your *Lock* be kept always clean and oyled, that the *Cock*, *Hammer*, and all the parts may be of a nimble Motion, upon the drawing the *Trigger*. Alſo a good *Flint* is of neceſſary uſe; and indeed the *Fowler* ought to be provided with ſeveral in his *Bag*, for fear of any Diſaſter of the other. The *Barrel* muſt alſo be always kept clean; for if foul, it never carrieth true, beſides 'tis ſubject to recoyl, which is dangerous; and it will occaſion that oft times it flaſhes in the Pan a good while before it goeth off, by which means the *Fowl* are alarmed, and ſo eſcape, with ſeveral more ill Conveniences that may attend.

You muſt alſo be well acquainted with the condition of the *Gun*, whether it be apt to ſcatter, or carry the *Shot* round within compaſs, that you may load her accordingly; for if you ſhoot at a Flock of great *Fowl*, then the *Shot* muſt be large, and there muſt be more *Powder*, and leſs *Shot*; and if you ſhoot at a ſingle *Bird*, then leſs *Powder* and more *Shot*; for the former will ſcatter, and the latter fly cloſe and compact.

Directions about Shooting.

IN *Shooting*, whether the *Game* be Flying, or on the *Ground*, on a *Tree* or *Hedge*, always (as near as you can) endeavour to *Shoot* with the *Wind*, and not againſt it; and rather ſideways or behind the *Fowl*, than in their *Faces*; and not at a ſingle *Fowl*, if you can compaſs more within your Level; and if on a *Tree*, *Hedge*, or the *Ground*, ſeek the convenienteſt ſhelter you can of *Hedge*, *Bank*, *Tree*, or the like, to be abſconded from the *Fowls* ſeeing you, which is very offenſive to them; and being within *Shot*, and a fair Mark, loſe no time but let fly.

A Spaniel of great uſe.

YOU muſt always have your *Spaniel*, which muſt be trained up for the Sport (of which more in the Chapter of Land-Spaniels) attending you very cloſe, to fetch what you have *Shot*, as well thoſe that are killed, as thoſe that are maimed, and it may be all, or moſt of them (eſpecially *Water-Fowl*) are not to be conveniently come at by you, ſo that they would be loſt, were it not for the aſſiſtance of your *Dog*, who upon your word of command, immediately ſeeks them out, and brings them to you. And be ſure to have your *Dog* in ſuch Obedience, as not to ſtir from your *Heels*, until you have ſhot, and give him the word of command to go; for to ruſh forth too ſuddainly upon the firſt *fire*, or *ſnap* of the *Cock* when 'tis probably the *Gun* goeth not off, as many mad headed *Dogs* will do, may be the loſs of your *Game* by Springing them.

Shooting Flying.

IT is now the Mode to *Shoot Flying*, as being by experience found the beſt and ſureſt way; for when your Game is on the *Wing*, it is more expoſed to danger; for if but one *Shot* hits any part of its *Wings* ſo expanded, it will occaſion its fall, although not to kill it, ſo that your *Spaniel* will ſoon be its Victor; and if well diſciplined to the Sport, bring it to you.

For your better inſtructions herein, I ſhall lay down ſome few Directions. The *Gun* moſt proper for this ſport, ſhould be about four Foot and a half long in the *Barrel*, and of a pretty wide *Bore*, ſomething under a *Musket*. You ſhould have your *Gun* always Cock't, in readineſs with your *Thumb* over the *Cock*, for fear of its going off contrary to your intention; ſo that when you meet with any *Game*, you muſt be quick, and having got an aim to your mind, let fly with all Expedition.

Some are of Opinion that you muſt *Shoot* ſomething before the *Fowl*, otherwiſe it will be paſt before the *Shot* can come to it; but that is a vulgar Error; for no *Game* can fly ſo quick, but that the *Shot* will meet it; for the *Shot* flyeth as wide as about the compaſs of a *Buſhel*, if rightly ordered in the Charging: Yet I am of the Opinion, if the *Game* flyeth as it were over your Head, that 'tis beſt to Aim at the *Head*; and if it flieth from you, to Aim as it were under its Belly. And 'tis found beſt to let the Game fly a little paſt you before you let fly; for thereby the *Shot* will the better enter the Body.

Your next buſineſs muſt be to be provided with one, or at the moſt two *Spaniels*, ſuch that are rather ſlack metled, not ranging out of *Shot*, than thoſe that are hot Spirited, to raiſe the *Game* beyond *Shot*, and withall ſuch that are at good command, being Trained up to bring the *Game*, and tender Mouthed, ſo as not to tear and ſpoil them.

Now for your better ſport, it were good to have a Companion alſo expert in this exerciſe, who muſt be provided likewiſe with a *Gun*; then let one go on the one ſide of a Hedge, or Field, and the other on the other, provided the Field be not too broad, and beyond the reach of your *Guns* to the midſt thereof; then caſt off your *Spaniels* to range about betwixt you (that near at hand, obſerving to follow their Motion, ſo that when any *Game* is ſprung up, you or your Companion may be in reach thereof; the like obſerve if you ſeek for *Cocks* or *Snipes* about *Plaſhes*. But above all things obſerve that you Train up your *Spaniels*, ſo that they may hunt not ſtragling, but in compaſs.

If you deſign for *Cocks*, and in a *Wood*, you may uſe two or three *Spaniels*; and if you had three or four *Men* on *Trees* to obſerve; that when the *Spaniels* have *Flaſh't* any, he that ſeeth it, ſhould ſay I have *Marked*, which gives notice to him that *Shoots* to come, and make his *Shot*. If you deſign to kill *Ducks*, uſe no *Dogs* to Range, but only to follow you cloſe behind, for thoſe ſort of *Fowl* will riſe faſt enough.

For your Learning to *Shoot* Flying, the Spring is the beſt time for *Swallows* or *Swifts*, and you will not miſs of them in *Church-Tards*, and ſuch like places.

This Method of *Shooting Flying*, may be per-for-

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formed also on *Horseback*, which is more commodious and less Toilsom; but then your business must be to bring your *Horse* to good command, and to understand his Duty, which he may be soon brought unto, the chief thing being to stand still upon the least check of the *Bridle*, but chiefly not to start at the noise, or report of the *Gun*.

CHAP. V.

Of the Stalking-Horse, *with several Artificial* Engines, *for the getting near to Fowl to Shoot them.*

FOr as much as *Fowl* do frequently lye remote from Shelters, so that the *Fowler* is deprived of a *Shot*; Therefore by the Assistance of a *Stalking-Horse*, he may command a *Shoot* at pleasure, and to that end observe these Directions.

Let your *Stalking-Horse* be of the largest size, 'tis no matter how old he be, but he must be well Trained up for your purpose, and be at ready command; and whereas there is some *Art* in Reclaiming a *Horse*, which by Nature is Wild and Fearful of *Noise* and *Fire*, such as that which a *Gun* makes, (especially at that nearest unto him) therefore get a strong *Chain*, and fasten it about his *Head*, then tye him up to a *Tree*, and Fire your *Gun* near him, giving him your Encouragement by *Voice* and *Hand*, stroaking him, and so continue *Shooting* near him several times; and although he continue his kicking and capering, yet in about a *Weeks* Exercise after this manner, he will become so Gentle, as to permit you to *Shoot* under his *Neck*, without the least reluctance or fliring. But some are of the Opinion, that during this teaching, the *Horse* must be kept waking in the *Nights*, and to *Shoot* under his *Neck* as well as in the Day.

Having thus brought him to endure the Noise of your *Gun*, your next business must be to Train him up to go as you would have him, moving gently and Feeding as he goes; and to stand still and Feed when you would, which must be done by Practice, and his observing your Motions, and Checks.

Now for this Exercise your *Horse* must be Naked, that is, without *Bridle* and *Saddle* (for that will fright the *Fowl*, and cause them to take Wing) only to have a small slip, about six or eight *Foot* long, tyed about his lower Chap, wherewith you may guide him as you see cause; and remember to contrive your self so, as to go just level with his *Shoulders*, for thereby his *Forefeet* will guid yours; and be advised to take your Level, from before his *Breast*, and not under his *Belly*, for that is too open and often lays you to the View of the *Fowl*, whereby you lose them.

By this means you may gently cause him to move up and down, to *Stalk* over *Rivers*, on the *Sea-shoar*, in *Moorish Grounds*, *Dry Lands*, *Stubble Fields*, or the like places; and as he moveth he will Feed: You must Shelter your self, and *Gun* behind his *Foreshoulder*, bending your *Body* low by his side, and keeping his *Body* always full betwixt you and the *Fowl*. Then having chosen your Mark, take your Level from the fore-part of the *Horse*, which is more safe and surer than under his *Belly*, and less perceivable; for the *Shoulder* of the *Horse* covereth the Mans *Body*, and his *Legs* the *Mans Legs*.

You ought not to endeavour the coming nearer the *Fowl* than your *Piece* will carry, nor to discharge out of Distance; for by the latter you are sure to miss, and by the former you hazard the disturbing them.

Some are of Opinion that to *Shoot* over the *Horses* Buttocks is the best way, and others are of the contrary, holding it best to *Shoot* over his *Neck*; but these ways I think not so good, yet leave them to your Judgment, and to use which way you find best.

You must upon no Account be without your *Spaniel*, which must be so exactly Trained up, that he may lye by your side until you have made your *Shot*; for if you appear in View, the *Fowl* will never permit you to come near them; and when once you have *Shot*, then give him your word of Command to fetch the *Fowl* unto you, especially those that you can't come at, which with practice he will soon be expert in, for they are Creatures of a great knowledge, and ready Apprehension, and naturally inclined to the Sport.

And for as much as *Stalking-Horses* are chargeable to keep, and that you can't always have one at command, I shall furnish you with other cheaper Inventions, with the help of which you may approach near enough, to make a *Shoot* at the most coy *Fowl* that are.

An Artificial Wheel-Barrow for Stalking.

TAke a *Wheel-Barrow* made of light *Fir* for the purpose, and build it about with *Boughs* and *Bushes*, so that you sit in it, and not be discerned, and when you come where the *Fowl* are, move it very gently, that the *Fowl* may not discern it to disturb them, then *Level* your *Gun* through the said *Wheel-Barrow*, and *Shoot* kneeling, your *Spaniel* being always in readiness, and at command to fetch your *Game*. But this Invention is something troublesome, therefore I shall proceed to some others more commodious.

The Stalking-Tree and Bush.

THe *Artificial Tree* is thus made: Take small *Wands*, or thin Splinters, foulded together in the shape of the Body of a *Tree*, and so covered with *Canvass*, and painted like the Bark of the *Tree* it represents, that it may not be discovered by the *Fowl*; of which the *Poplar* and *Willow* that grow by the *Rivers* sides are the best, as being most known to the *Fowl*, and so the less to be suspected.

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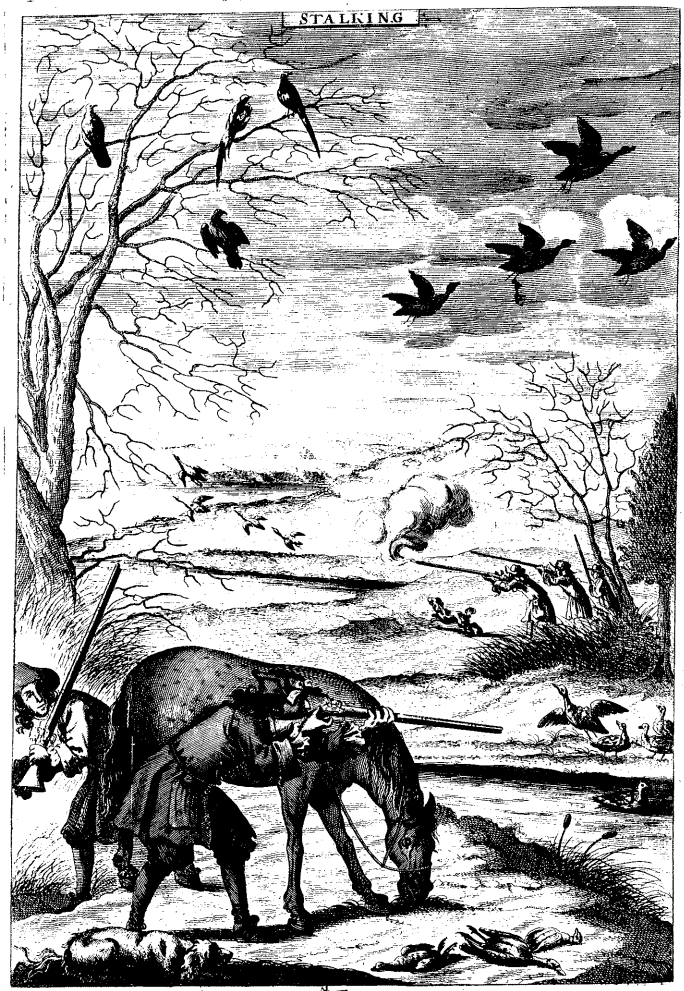
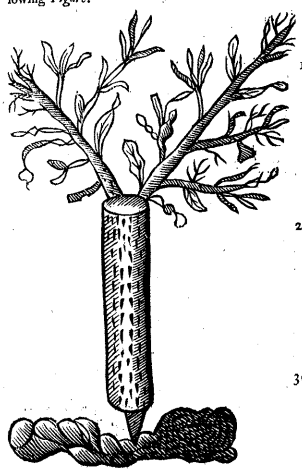


To the Hon.ble S.r Henry Goodricke of Ribston Parke in Yorkeshire Knight & Bar.t his Majesties Envoy Extraordinary to the King of Spain. Anno Dom. 1683/4.

This Plate is humble dedicated by Richard Blome

Arthur Soly fecit 1683

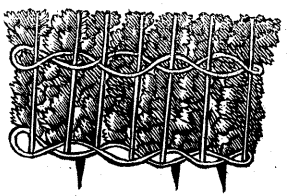
Having made the *Boal* of the *Tree*, as aforesaid, in certain Holes made on the Top for that purpose, stick in the *Boughs* and true natural *Branches* of the *Tree* which you would make, in such sort as they grow at that Season, according to this following *Figure*.



As for the *Stalking-Bush*, it must not be so tall as the *Tree*, but much thicker, and may be made either of one *Bush*, or of several neatly entangled and made fast together, and about the height of a *Man*; and in the midst of the bottom must be a small Stake, with an *Iron-point*, to drive into the Ground to support the *Bush* whilst you take your aim. This way is so easie, that there needs no further explanation.

The Stalking-Hedge.

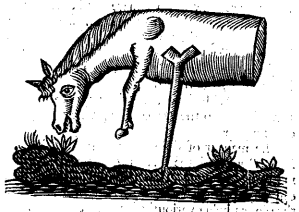
The *Stalking-Hedge* should be two or three *Yards* long, and about a *Yard* and an half high, and made in small Wands, and bushed out in the manner of a true *Hedge*, with certain Supports or *Stakes*, to bear it up from falling whilst you take your aim to *Shoot*. And this is to be carried before you for your Shelter from the *Fowl*.



These dead *Engines*, which carry not the shape of a living *Creature*, are not so necessary and useful to stalk with, as for a Stand; for their seeing a dead thing move will cause apprehension of fear and danger in them, as some design against them; therefore I shall give some Examples of such living *Shapes* whose motion is not strange unto them; and first of the *Horse*.

An Artificial Stalking-Horse.

Take some old *Canvass*, cut it into the true shape of a *Horse* with the Head as if *feeding*; then *paint* it like a *Horse* of a Brown colour, which is best. It must be made so portable, that it may be easily carried with one Hand, so that it may be moved in such manner as if it grazed as it goes, nor must it exceed the usual bigness of a *Horse*; and to make it so light, it may be stuft with *Straw*. In the midst let there be fixed a *Staff*, with an *Iron-pick* in it, to stick down in the Ground at pleasure, and to stand fast whilst you take aim to *Shoot*, as also to turn and wind any way for the advantage of the *Wind*, or the like. This *Figure* shews its form.



There are some of Opinion, that the stuffing the *Canvass* thus out is not so good as unstopt, being more troublesom to command; but if unstopt, it must be artificially painted, and very thick, lest in the turning it against the *Sun* it appears transparent, which will affright the *Fowl*; and it must be proportionable to a *Horse*, being stretched out upon Splents of *Wood*, or strong *Wier*. This is so easie to be made, that it needs no *Figure* to explain it; and it were not amiss, if you cut a little Hole through the *Shoulder-part*, to level your *Gun*.

Instead of this Artificial *Stalking-Horse*, you may make in *Canvass* (either stuft or unstuft) the shape or proportion of a *Cow* or *Ox*; which must be also very well painted to the life, and according to the usual colour of *Cattle* in those parts, and be very exact in the *Horns*, to make them suitable to the Breed of that sort of *Cattle* there usual; and thus by the change of your *Engines* you may make your Sport the longer to continue.

If you design these *Artificial Stalking-Engines* for *Fowl* that flock together, especially *Water-fowl*, they will soon grow too crafty for those unstuft; but for *Pheasants*, *Woodcocks*, and the like, there can't be a more useful and cheaper

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way than the unstuft; for when you have made a *Shot*, you may roul up your *Engine*, and keep it for another occasion.

To conclude this *Chapter*, observe this Caution, That these several sorts of *Engines* are to be used early in the Morning, or late in the Evening, and they are more proper for *Water* than *Land-fowl*; for when the *Sun* is up, its reflections sooner discovers the Imperfections in your *Engine*, which the *Water* better hideth.

CHAP. VI.

Of a Decoy-Pond, *with some Directions concerning the same, and* Decoy-Ducks.

THe *Fifth Chapter* teacheth you several ways to take *Fowl* by *Stalking-Engines*, for the getting near to *Shoot* them; I shall now speak of *Decoys*, by which means great store of *Ducks* and *Teal* are drawn into a Snare, and that by the subtilty of a few of their own kind, which from the *Egg* are trained up to come to hand for the same purpose.

These *Decoy-Ducks* fly abroad, and light into the company of Wild ones, and being become acquainted with them, by their allurements do draw them into the *Decoy-place*, where they become a *prey*.

The manner of doing it, and the making the *Decoy-Pond*, with the several Apartments belonging to it, requires a long Discourse; nor indeed can any particular *Rules* or *Directions* be given therein, as being variously made according to the Situation of the Place, which must be considered: so that such as would make any, had best inspect some already made, which are frequent in divers Parts of this *Kingdom*, especially in *Lincolnshire*, *Cambridg-shire*, and such like *Fenny Countries*; for it must be *Moist*, *Moorish*, and *Fenny Grounds*, with the conveniency (if possible) of a *River* runing through, or by it; so that I shall only say, that the place where these *Decoy-Ducks* entice them, must not be very broad, and set on both sides thick with *Osiers*, and at the Top and Entrance must be *Nets* to let down by the Man that is to attend it, when he seeth the *Ducks* all entred in, by which means they become taken.

And great care must be taken, that the *Nets* are not let down until all are within the limits of the *Nets*; for if any should escape it would be very prejudicial, for such a *Duck*, or *Ducks*, would be shy of being drawn into the like Snare again, which would occasion others in the Company to do the same, and thereby the *Decoy* would be much prejudiced.

CHAP. VII.

Directions for the making, choosing, ordering and preserving Nets.

BEfore I enter on the ways of taking *Fowl* with *Nets*, it will be necessary to give you some Directions touching the *making*, *choosing*, and *preserving* them, lest the charge exceed the profit; for *Nets* are a dear and perishing *Commodity*, without due care in the well ordering them; and it were very good Husbandry if you, or any belonging to you, had the Art of making them, for some are very chargeable to buy. The *Instruments* or *Tools* required for the making them are *Wooden-Needles*, of which you should have about half a Dozen of several sizes, and as many *Moulds* of divers sorts, some round, and others flat; also a pair of flat Round-pointed *Scissers*, and a *Wheel* to wind off the *Thread*. It can't be expected to give *Rules* for the knitting or making the several sorts of *Nets*, but it is requisite to be understood by every compleat *Fowler*, were it only for the mending them abroad as well as at home.

But a word or two concerning the making thereof: Let your *Packthread* be the best and evenest you can get, and greater or smaller, according to the *Fowl* you design to take; the like must be the *Meshes*; for great *Fowl*, let the *Meshes* be about two *Inches* from point to point, for the larger they are (provided the *Fowl* can't get out) 'tis the better to entangle them. Let your *Nets* be not too deep nor too long, for that is troublesom to manage; let them be well verged on each side with a strong twisted *Thread*.

As for the *Colouring* your *Nets*, they should be either *yellow*, *green*, or *russet*; the latter is done by putting them in a *Tanners-Pit*, where they must lye until well coloured, and this Tincture is also an excellent preserver of them: The second colour is *Green*, which may be thus made; Take *green Wheat*, chop it, and boyl it in Water, and then rub your *Nets* therewith, and let them lye infusing therein about twenty four hours; this is the colour that *Birds* least fear, as resembling the *Grass*. But to be more exact in this colour, it were well to have it done by some *Silk-Dyer*. The *Yellow* is done by steeping the *Net* in the Juice of *Salandine*, which being dried in the shade will become a good *yellow*; for it must not be over-bright, but of the colour of *Stubble* in *Harvest* time, for which Seasom this Colour is most proper.

For preserving your *Nets*, be sure to keep them dry; and to that end, hang them abroad in the *Sun* whenever you have used them in the *Dew* or *Rain*. And be careful to mend the least *Rent* or *Breach* upon the first discovery, lest it become *worse*; and be perswaded to hang your *Nets* from the *Wall*, to prevent their being injured by *Rats* and *Mice*, which are great Enemies to them. What relates more to *Nets*, I shall speak of when I treat of each sort.

In the next place I shall proceed to the use of *Nets* for the taking *Fowl* and *Birds*, both for *River* and *Land*.

CHAP. VIII.

Of the taking of Partridges *with Nets, as also with Calls, Engines, &c.*

PARTRIDGES are for the generality cowardly and fearful, likewise very simple, and easie to be deceived with *Nets*, *Baits*, *Trains*, *Calls*, *Engines*, &c. so that the taking them may be obtained by a Mans own and only labour and industry with great ease and pleasure.

The most usual ways are by *Nets*, *Engines*, *Calls*, by the *Setting-Dog* and *Stalking-Horse*; for as touching the killing them with the *Hawk* it is treated of in *Hawking*; therefore I shall omit it here.

In the first place, 'tis necessary to know their *Haunts*, which are not certain like *Pheasants*, but various, yet the places they most delight in are in *Corn-fields*, during the time that it grows, or is standing; for under that *Covert* they shelter and breed, nor do they quit the *Corn-fields* after *Harvest*, for the *Stubble*, especially of *Wheat*, affords them *shelter* and *food*; but when the *Stubble* is soiled or trodden down with *Cattle*, then they forsake it, and betake themselves to the *Barly-Stubble*, and in the *Furrows* amongst the *Clots*, *Brambles*, *long Grass*, and *Fog*, hide themselves and their whole *Covys*.

Upon the approach of the Winter Season, when the *Stubble-fields* are broken up, or that it is trodden and spoiled with *Cattle*, they betake themselves to inclosed *Grounds* and *Upland Meadows*, and take Covert under *Hedges*, amongst *Mole-hills*, at the Roots of *Trees*, amongst *Broom*, and in the foggy dead *Grass*. You shall also find their Haunts all the Year long in small *Coppices* or *Under-woods*, especially if adjoyning to *Corn-fields*; also in *Closes* pestered with *Shrubby-Bushes*, *Brambles*, *Broom*, *Fern*, or the like *Covert*; also in the height of *Corn-Harvest*, when the *fields* are pestred with *People* and *Cattle* to disturb them; they frequent the *Fallow-fields* all the Day, and early in the Mornings and late in the Evenings come thither to feed.

Having knowledge of their *Haunts*, according to the situation of the Country, whether *Mountainous* or *Plain*, *Champain* or *Woodland*; and the Season of the Year, whether *Summer* or *Winter*; Your next business is to find them out in their *haunts*, and where they *lodge*, and this is done divers ways; some there are that will find them out by the Eye, although they lye never so close couched together, distinguishing them by their colour from the Earth, which is an Art not to be taught, but only by practice; and in seeking them this way, make your approach nearer and nearer unto them until you perfectly discern them (provided you do not stand at gaze upon them) but keep in a continual motion, looking another way as if you saw them not; for they are a lazy and fearful *Bird*, and unwilling to take Wing.

Partridges may also be found out by their *Haunts* where they did last couch or lye; that is, whether the *Haunt* be Old or New, which may be thus known. If it be new, their *Dung* will be green and soft; also the padling with their Feet round about will be soft and dirty, and the Earth will appear new broken, and of a darker colour than that round about it, and if very new the place where they sat will be warm and the ground smooth, with some Down, or small *Feathers* scattered upon it. If the *Haunt* be old and long forsaken, the *Dung* will be dry and brickle, their Treading will also be dry, rough and hard, and of the colour of the rest of the ground; for the less dry, clean and soyled the *Haunt* is, the longer hath it been left; and the more *moist*, *dirty*, &c. the later was it since they were there.

If you find the *Haunt* to be new and warm, then be assured they are not far off, if not forced away by some disturbance; therefore be very careful and move with leasure, having regard to the *Furrows* of the *Lands*, to the end you may not raise them, and there is no doubt but that you will find the *Covey*, and so soon as you do, immediately wind off from them, and look not upon them but carelessly cast your Eye another way, and so fetch a larg circumference about them, and lessening it by degrees until you have discovered them; and although they lye dispersed (as oft times they do) as being by the nature of the old Ones to lye a little distance from the *Covey*, yet you need not fear the taking them.

To take Partridge by the Juck.

THere are others that find them out by going to their *Haunts* very early in the Morning, or at the close of the Evening which is called *Jucking time*, and there listen for the calling of the *Cock-Partridge* which will be very loud, and with no small eagerness, upon which the *Hen* will answer him and soon come together, which you may easily know by their chattering, and rejoying Notes, upon which take your Rang about them, drawing in by little and little to the place where you heard them *Juck*, and be sure to cast your Eye about, especially towards the Furrows, and without doubt you will soon discover how they lye, and accordingly proceed to take them.

To take Partridge with the Call.

IT is an excellent way to take *Partridges* with the *Call*, concerning the making of which, and the manner of using it, I shall speak of more anon.

With this *Call* having learnt their true and natural *Notes*, and being expert to tune every *Note* in its proper Key; and arrive to the knowledge of

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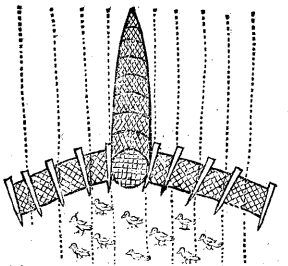
of the due times and Seasons for every *Note* which are as various as the *Pheasant*, if not more; then being prepared with your *Calls*, go to their *Haunts* very early in the Morning, or late at Night, (the rest of the Day being inconvenient) and having placed your self secretly, so as to see and not be seen, as if in *Wood-lands* under some *Bushes*, *Brambles*, or the like; If in the *Champain*, under some *Bank* or *Ditch*, If in *Meadows*, under the *Hedges*, and if in *Corn-fields* in the *Furrows*. Then listen to hear them *Call*, and accordingly answer them with your *Call* in the same *Note*, always altering, or doubling it over more or less as the *Partridge* doth, until you find it draweth nearer and nearer unto you, and not only one single *Partridge* will come, but all that hear it, as being so natural to them.

Of the Net.

THe *Net* for taking *Partridge* should be shaped and proportioned in all points as to breadth and length like the *Pheasant-Net*, only the *Mesh* must be somewhat smaller, but as to the colour it may be the same; yet some are of Opinion, that it were not amiss if it were somwhat longer and broader, for thereby you may catch them with the greater certainty, your circumference or walk about them being the larger, and will cover more ground, but let not your *Net* be so long, or broad as to be cumbersom unto you; For that will rather obstruct than further you; The *Nets*, if for a *Covy* should be sixteen or twenty *Yards* long, and four or five deep; and if in *Paring* time, then eight or ten *Yards* long, and about four deep; And let your *Lines* and *Cords* be answerable.

Having your things in order, and found out a *Covy*, draw forth your *Nets*. And taking a large circuit about the *Partridges* with a quick pace and carless Eye, as if you did not see or regard them, until you have made ready your *Nets* for the purpose, then begin to draw in your circumference less and less, until you come within the length of the *Net*; then pricking down a *Stick* about three Foot long, to which fasten one end of the *Line* of your *Net*, and making it fast in the Earth as you walk about without making any stay, you shall then (letting the *Net* slip out of your hands) spread it open as you go, and so carry it and lay it over the *Partridges*; but if there be more than your *Net* will cover by their straggling, then draw forth another *Net*, observing the same method and joyning them close together, and after this manner you may do with a third, if occasion requires. And having thus covered them, rush hastily into them, and with an affrighting noyse force them to Spring, and thereby they are entangled and may be taken without hurt. And in this manner you may take them at all Seasons, and in all places where they *Haunt*,



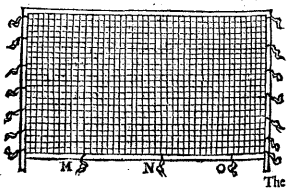
This is a *Net* so well known, that it is needless to give any further description of it.

Having found out a *Covy*, take a compass, and so pitch the *Net* at a good distance from them, but sometimes farther, and sometimes nearer as the Ground falls out, and then surround them with your *Stalking-horse*, or for want thereof with the *Artificial Stalking-horse* or *Ox*, as in the fifth *Chapter* treated of; and gently drive them towards the *Net*, not coming on them in a direct Line, but by windings and turnings, and sometimes standing still, as if the *Horse* grased. If in case the *Partridge* make a stand, and look up, 'tis a sign they are afraid and intend to take *Wing*; therefore make a stand or a little retreat, and when you find them quiet after a little respite that they are busy in seeking for *Meat* (which is a good sign they are not afraid) you may move nearer; and if any single *Partridge* lyeth remote from the rest, he must be fetched in by taking a circumference about him, and thus they may be driven like as it were a *Flock* of *Sheep* into a Pen. But a live *Horse* made for the sport doth far exceed the artificial *Stalking-Horse*, or *Ox*.

The *Wings* of the *Tunnel* must not be pitched in a direct *Line*, but inclining to a Semicircle, when the *Partridges* are at the mouth of the *Tunnel* the old ones will stand a while as if to consider, but pressing gently on, some of the young ones will venture in, and then all the rest will follow, upon which make in apace to secure them from returning back and making their Escape.

Of the Spread-Net, or Drag-Net.

THere is another way to take *Partridges* with a *Spread-Net*, which by some is called a *long Tramel-Net*, the *Figure* thereof is here described.



The

The use of this *Net* is thus; a little after *Sunset* go into some *Field*, or *place* where you think to find sport, and there hide your self, and you will soon know if there be any by their *Calling* and *Judging*, and then they will take a small flight, and oft times two or three before they go to roost; and be sure to observe exactly the place where they *roost*, by making some Mark at a distance, to the end you may not be to seek the place in the dark, Then prepare two strait light *Poles* which must be as long as the *Net* is broad, which to do well should be about fifteen or twenty *Foot*, and of a proportionable length; As to the *Poles* they need not be all of one piece, but of two or three, well fixed together fasten the *Poles* upon the ends of the *Net* with small *Cords*, and let the *Tail* of the *Net* have three or four little *Cords* fastned with small *Bushes* to trail on the ground, that the *Partridges* may be forced to spring up when they hear the rustling noise. They are represented by the Letters *M*, *N*, *O*.

This Sport cannot well be performed without one to assist you; Then being near the place, unfold your *Net* where the Ground is clean, and being extended each must lay hold on the middle of the *Poles*, lifting up the higher end of the *Net* about five or six Foot from the Ground, and letting the lower part follow sloping about half a Foot from the ground. The *Cords* with the *Bushes* must drag on the Ground, and should not be above two foot long. When the *Partridges* rise both must let go their hands, and let the *Net* fall on the ground upon them Sometimes it so falls out that the *Partridge* rise before the *Net* be over them, which may be occasioned by the too great noise you make; therefore be as still as possible, and if so, then let them rest at least two or three hours before you attempt any thing again; then march over the whole *Field* with your *Net* ready set, and 'tis ten to one but you will meet with them in the end.

This way is good only in dark Nights, therefore some use to carry a *Light*, or some *Fire* with them, which the *Partridges* perceiving believe to be Day-light, and are discovered by the noise they make in wakeing and stretching out their *Wings*; then they hide the Light and draw the *Net* over them.

How to take Partridges with Lime-Rods.

TAke the largest and strongest *Wheat-straw* you can get, or for want thereof strong *Rye-straw*, cut them off between knot and knot, observing that the lowest *joynts* are the strongest and best. These *Straws lime* with the strongest *Bird-Lime* you can get or make, in doing of which observe the same way as formerly directed for preparing your *Lime-Rods*. Then go to the Haunts of the *Partridges* and call them, and if you are answered by them, then at some distance from you prick down these *Limed Straws* in several cross-rows, not only cross the *Lands*, but the *Furrows* also, taking within your circumference two or three *Lands*; Then lie down close, and call again, not ceasing till you have drawn them towards you, by which means they will be no sooner touched but intangled and besmeared, so that you may take them.

By the way take notice that this manner of taking *Partridges* is proper only for *Corn-Fields*, and chiefly in *Stubble* time. But if you would take them in *Woods* or *Meadows* with *Bird-Lime*, then use the ordinary *Lime-Rods* as before treated of, and order them as the *Lime-Straws*.

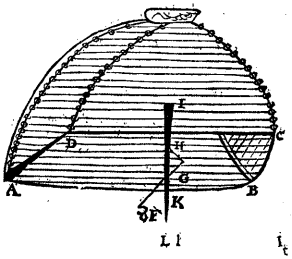
Taking Partridges with an Engine, or Driving them.

THe taking *Partridges* with an *Engine* is no less profitable than either of the other, and somewhat more delightful; you may use this way in any *Grounds*; The manner how to do it is thus, first make an *Engine* in the fashion of a *Horse* of *Canvas* stuft with *Straw* according to the examples of artificial *Stalking-Horses* already treated of.

Having this *Engine* and your *Nets* in readiness, go to their Haunts, and having found out a *Covy*, pitch your *Net* with the greatest advantage of secrecy you can, lying on the Ground that they do not see you until they are intangled; for by gentle Steps you may steal upon them, and drive them before you, like as it were *Chickens*, provided you are not too hasty; If they run any By-way or contrary to that which you would have them, then cross them with your *Engine*, and they will presently run back into any Tract you would have them; and thus by a gentle and slow pace you may drive them into your *Net*. Be sure to take the advantage of the *Wind*. Let your *Nets* be pitched slopewise, and let your *Face* be veiled over with something Green or dark; Blue *Sarsenet* is very good.

Several sorts of Pitfalls above and under Grond, for taking whole Covies of Partridges, as well as single ones, or indeed any other Birds.

THere is a cheap invention for the taking of a *Covy* of *Partridge*, or any other *Birds* in Flocks, or single by a *Pitfall*. You are not obliged to wait upon it, except to watch others from stealing your *Game* when taken. The *Engine* is represented by this *Figure*.



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It is compoſed of four Sticks, or pieces of *Timber A B, A D, C D,* and *B C,* each about three Foot long, and bored through within two Inches of the end, with a Hole big enough to turn ones middle *Finger* in. They muſt be placed on each other in a Square, and let into each other about half the thickneſs of the Stick; then take two Hazel rough *Rods* about the bigneſs of ones Finger, each four or five Foot long, which muſt be fixed in the foremention'd Holes, croſſing them over each other, that their other ends may be fixed in the oppoſite *Angels*, as the Corner Sticks in *Cages* uſe to be laid; then you muſt have ſtore of light ſtrait *Sticks*, longer than each other by degrees, about the bigneſs of ones *Finger*, which you muſt compile one over another, the longeſt firſt and the ſhorteſt laſt up to the height of the croſſing of the two *Rods*, ſo that the whole will reſemble a kind of *Bee Hive*; but remember to leave a Hole at the top, to be covered or uncovered with ſome *Stone*, or the like, to take out the *Birds* when they are in the *Pit-Fall*. You muſt at laſt bind the end of your *Sticks* to the two *Rods* with *Oziers*, ſtrong *Pack-Thread*, or ſmall *Cords*, and this is all that belongs to the *Pit-Fall*. But for the erecting or tilling it up do thus, Take a Stick F G, Three *Foot* long, and the bigneſs of ones little *Finger*, which muſt be ſmoothed above and below; then tie the end *F*, with a little *Cord* to the middle of the foundation *Stick A B*, the other end of the *Stick F G*, muſt have a ſmall Notch in it about two *Inches* from the end. The next thing is to provide another *Stick I K*, about a Foot and a half long, with a ſmall *Cord* fixed on the upper end thereof, where you may place another little *Stick G H*, half a Foot long, having the end *G* ſhaped like the ſharp end of a *Wedge*, the lower end of the *Stick I K*, muſt be fixed into the *Earth*, which being done, the fore part of the *Pit-Fall D E*, will come to be lifted up, and then place the end *H*, of the little *Stick H G*, under the *Cage* to ſupport it, and the other end ſhaped like a *Wedge* into the Notch of the *Stick F G*; then let the *Pit-Fall* reſt gently on it, and it will be ready ſet with one ſide lifted up about a Foot high, and the *Stick F G*, will be about three *Inches* from the Ground; then ſtrew your *Bait* under the *Cage*. If you are certain there is a *Covey* with frequents any Ground, if you can entice them to feed in one certain place but two or three times, you may then plant your *Pit-fall* with good ſucceſs. The ſame *Pit-fall* will ſerve to take ſmall *Birds*, *Hares*, *Rabets*, or *Vermin*.

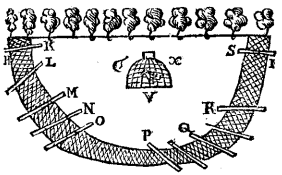
Directions to take old Cock Partridges, with Natural and Artificial Calls, with Directions to make them.

THis way of taking them is laborious, and requireth much exactneſs in imitating their ſeveral *Voices*, and at laſt you can pretend to take but one at a time, however that there may be no deficiency, in giving you the ſecrets in this Art of *Fowling*, I ſhall ſhew you ſeveral ways to take *Partridges* with *Calls*.

You muſt know that *Partridges* begin to pair, or Couple about *February*, or the beginning of *March*, if the Weather be not cold, and do continue in their *Woings* until the end of *July*.

It hath been the Opinion of ſeveral, that one *Hen* will fly to the *Call* of another, moved thereto through jealouſie and fear of loſing their *Cock*; and that they fly on purpoſe to beat that *Hen* that calleth; but there is no ſuch thing, the occaſion of this Error hath proceeded from hence, that there are ſome *Cocks* that call juſt like *Hens*.

This Sport may be practized every day, during the aforeſaid Woing Seaſon, from *Day Break*, until *Sun Riſing*, and from *Sun Setting* until *Night*. This enſuing *Figure* doth repreſent the manner how to take them.



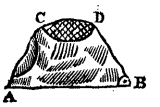
Suppoſe the ſpace from *H* to *I*, be a *Hedge* that encloſeth ſome piece of *Wheat*, *Barly*, or other *Grain*, ſet your *Hen Partridge* in a fine open thin *Wyer Cage*, ſo as ſhe may be ſeen at a good Diſtance, but not the *Cage*, the Letters *T, V, X*, is the place where ſhe muſt be placed, then pitch your *Net* called a *Hallier*, quite round, as you ſee it formd by the *Letters*, *K, L, M, N, O, P, Q, R, S*, each part diſtant from the *Cage* about twenty Foot, then retire behind the *Hedge*; if any *Cock Patridge* in the Ground *Call*, the *Hen* will preſently Anſwer, nor will the *Cock* fail to come unto her, and ſometimes five or ſix will come together and fight with each other juſt under the *Net*, which of them ſhall have the *Hen*, until at length ſome of them find themſelves entangled: In this caſe you are not preſently to ſally forth, for peradventure ſome more may be likewiſe enſnared; nor can they ſoon diſintangle themſelves.

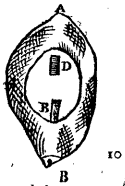
I ſhall give you one caution to ſave a great deal of pains, that is, never pitch in any place but where you have heard ſome *Cock call*; and then to *pitch* within ſixty or eighty Paces of him, that they may be within hearing of each other.

Let your *Cage* be coloured green, and let the *Bars* be at ſuch a diſtance, that the *Hen* may thruſt out her *Head* and *Neck* to hearken and *Call*; and if you have well Trained her to this ſport, ſhe will be induſtrious at it.

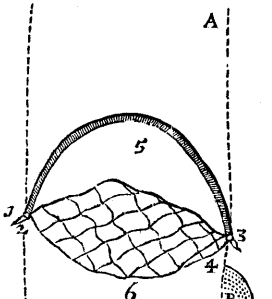
How to make Artificial Calls.

YOU have had Inſtructions as to the *Natural Calls*, now follows to ſpeak of *Artificial* ones, with directions how to make them; theſe following *Figures* do repreſent the Forms thereof. The





The firſt ſheweth the Outſide, and the ſecond the Inſide, they are beſt made of *Box*, *Walnut-tree*, or ſuch kind of hard *Wood*, and formed as you ſee like a *Boat*, and about the bigneſs of a *Hen Egg*, with two ends *A B*, bored through from end to end; and that about the middle *D C*, there muſt be a Hole about the bigneſs of a *Sixpence* hollowed within to the bottom; then have a *Pipe* of a *Swans Quill*, and the *Bone* of a *Cats Foot* opened at one end, which you muſt convey into the *Hole A*, and ſo thruſt it on to the opening *D*, the other end of the *Bone A* muſt be ſtopt; then take a *Goo ſquil* opened at both ends, which muſt be put in at the *Hole B* until the end *C* be near the end *D* of the *Bone*, and that blowing at the end *B*, you make the Noiſe of the *Cock Patridge*, which varieth much from the *Call* of the *Hen*; and you muſt remove further, or nearer the end *C* of the *Quill*, from and to the end of the *Bone B*, until you have found out the exact Note, for it is not ſoon done, your *Call* being fixed, and that you are expert in the *Notes*, get a *Net* called a *Pocket Net*, the form of which is here deſcribed.



To this *Net* fix a pliant *Stick* of about four or five *foot* long; and ſo you may go abroad early in the *Morning*, and late in the *Evening*, or as occaſion ſerves, when you hear a *Partridge Call*, the manner of *pitching* the *Net*, and the placing your ſelf, is repreſented in the ſaid *Figure*; for Example, ſuppoſe you heard the *Partridge Call* at *A*, then hide your ſelf flat on your *Belly* at *B*, having planted your *Net* juſt in the Way or Furrow, betwixt your ſelf and the *Partridge*, but within ten or twelve Foot of the *Net*, eſpecially if there be any *Buſh* or advantage of Ground to ſhelter you. The way to ſet the *Net* is thus; Tye the *Packthread*, Number 1, which paſſes into the *Buckle* Number 2 of the *Net*, unto the end of the *Stick*, which muſt be ſtuck in the Ground, and ſo bending it like a *Bow*, faſten the other end of the ſaid *Stick* in the Ground on the other ſide or *Furrow*, having in like manner tyed to it the end of the *Packthread* Number 3, which paſſeth through the *Buckle* Number 4, ſo that the two *Buckles* 2 and 4 may come pretty near each other; then take one end of the *Pocket-Net*, Number 5 or 6, and caſt it over the bended *Stick*, ſo that it may lye thereon, the other end may hang on the *Ground* in ſuch manner, that if any thing endeavour to paſs by that way, it muſt needs run into the *Net*. Every thing being in order, and that you hear the *Partridge Call*, you muſt return two or three Anſwers louder or ſofter, according to the diſtance from whence you hear the *Call*, and only ſo loud as to be heard, and the *Partridge* will preſently make near you; then give him a ſoft *Call*; when he has anſwered your firſt *Call* he will begin to run, and coming near the *Net* will make a little pauſe, and forthwith ruſh on ſo that the upper part will fall on him and entangle him, then take him out; and after this method you may take ſeveral. But this way of taking them laſts only during the time of their *Breeding*, which is in *April*, *May*, *June*, and *July*.

Another way to take Partridge with the Call, and a Broad Net.

HAving found out the *Partridges* by your *Call*, as aforeſaid, pitch up your *Broad-Net*, which ſhould be about fourteen or fifteen *Yards* long, and ſeven or eight deep. This *Net* ſpread over the *Ground* near them, the length-ways to them; then peg down the *Net* to the *Ground* on all ſides, except that towards them, and that raiſe up in the midſt by a *Stick* about four Foot long, with a Notch in the Top, the better to hold the *Line* of the *Net* from ſlipping, and bend the Stick from the *Net* to make it the ſtiffer, which *Stick* muſt be thruſt into the Ground, the better to hold it.

Your *Net* being thus fixed, you muſt have either a *Natural*, or an *Artificial Stalking-Horſe*, to drive them into the *Net*; but I hold the Natural one the beſt, which muſt be one that is trained up for the Sport, as already taken notice of in the *fifth Chapter*.

Directions

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Directions to take Partridges in hard Frosty-weather with Slipping-Knots.

IN hard Weather, whilst the *Snow* is on the Ground, and that *Birds* are very hungry, make your search in small *Coppice-Woods*, and in *Corn-Lands*, especially near little *Springs* where the *Snow* doth commonly lye; and if you find, that either by the tracts of their Footing, or by their *Dung*, that they have been there; then cleanse away the *Snow* about thirty Foot square, and your small *Hedge*, as before directed, thwart the Lands that are sowed, and in the bottom of each *Furrow* plant the Snare, or *Runing-Loop* of *Horse hair*, just the height of the *Partridges Neck*; then strew a little *Oats* or *Barley* on both sides the *Hedge*, and let it be ready fitted by *Sunset*, and by *Morning* you may expect to take some, especially if you had given them a *Bait* twice or thrice before; for the expectation of finding *food* will entice them to come.

The same Art may be used when there is no *Snow*; if you are sure the *Partridges* frequent any certain place, and if it be *Pasture-ground*, it is then in vain to make your *Hedge-rows*; you need only in that case to plant the little *Stakes* confusedly up and down in good quantities, with little *Runing slips* and *Loops*, and throw some *Grains* of *Corn* near every one of them. I will not say you may take a whole *Covey*; but questionless if a *Covey* light amongst them, you will take the greatest part.

If you plant these Devices in *April*, *May* and *June* for old *Cock Partridges*, you must then be sure to make a kind of a Slopeing in your *Passage* where your *Collar* is placed, that the *Partridges* may be forced to stoop with their *Heads*; for else they run at those times to Couple with each other, and then carry their *Heads* aloft; and without this Caution you will not take one in an hundred.

I should here speak something of the *Setting-Dog*; but by reason I design a *Chapter* for that purpose, I shall omit it here.

CHAP. IX.

Directions for taking Pheasants *several ways.*

PHEASANTS, as well as other *Fowl*, are to be taken divers ways. I shall name those in most use, which are performed with the *Gun* and *Spaniel*, with *Nets*, with the *Call*, with the *Lime-Bush*, or with particular *Engines*, of which there are divers kinds, and of sundry shapes, according to the Season of the Year they are to be used in, and the manner of the place in which they are to be used.

Pearching of Pheasants, *and Shooting them.*

YOu must be provided with a good *Spaniel*, that will Range well about, and when he hath *Pearched* the *Pheasant*, to *Bay* soundly, which will cause them to keep the *Pearch* the better; then hearing whereabouts he is, make up to him as privately as possible, and having spied him (being at a reasonable distance) make your *Shot*; and for your *Dogs* encouragement, let him bring it to you, and make much of him.

For your *Dog*, it may be either a *Land* or *Water Spaniel*, or one betwixt both, provided he is trained up to a *Gun*, and to bring his *Game* to you.

If you desire to take them in the *Night* (provided it is *Moon-shine*) the places where they usually *Pearch* (if it be Windy) are upon the lower *Boughs*, near the *Body* of the *Tree*; but if in a clear and fair *Night*, or although a little *Rainy* they will set at the further ends of the *Boughs*; and when you find them, make your *Shot*.

You may have a *Dog* to fetch them to you, in case they are not killed dead, but run away, as having broken a *Wing*; but your *Dog* should not *Bay* and make a Noise, as in the *Day*.

They are to be found in *Corn-fields* and *Hedge-rows* at other times, where they may be *Shot* and *Pearched*, as aforesaid.

Taking Pheasants *with Nets.*

FOr the taking *Pheasants* with *Nets*, which is only in *Crowing-time*, that is, about the end of *February*, and in *March*, before they begin to breed: It is done either generally, or particularly. Generally, when the whole *Eye*, that is, both the Old *Cock* and *Hen*, with all their young Ones, or *Powts*, as they flock and run together in the thick *Woods* or *Coppices*, are taken; or Particularly, when you take none but the Old, and such of the Young as are of Age fit for Coupling, so that you can't have any assurance with your *Nets*, to strike at more than one or two at a time; for the *Pheasant* is of a Melancholy and Sullen disposition, and when once they have Coupled do not accompany in flocks as other *Birds*.

Now for the greater facility of taking them you must be acquainted with their *Haunts*, and their usual places of *Breeding*, which are in thick young *Coppices* well grown, and free from the annoyance of *Cattle*, or the Path-ways of *Men*; for being of so fearful a Nature, they esteem the strength of their *Covert* their only safety, and do not abide or breed in open or plain *Fields*, nor under the *Covert* of *Corn-fields*, low *shrubby Bushes*, or in large and tall *Trees*.

Having found their *Haunts*, the next thing will be to find out their *Eye*, or *Brood*, which may be done several ways; But take notice that *Pheasants* do usually come out of the *Woods* and *Coverts*,

PEARCHING the PHEASANT
To The Right Hon.ble Earle of Seafort, Kentaill, Baron of Lews, Shiriff principall & North.
This Plate is humble dedicated
Kenneth M.c Kenzie Lord M.c Kenzie, & Ardelu, Islandonan, & of the Shires of Ross, Nass. &c.
by Richard Blome.
Arth: Soly: feit

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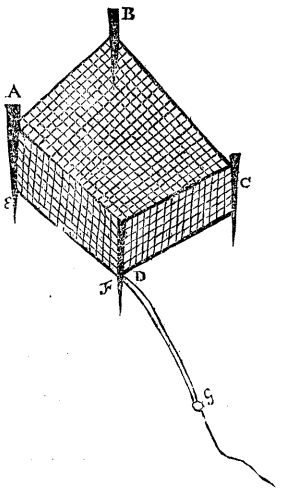
the aforesaid *Game* off from their own Ground, yet would be glad to preserve them for their own use, and so to manage the *Game*, that they might always have some thereon as well to please them selves, as to delight a Friend that desires to see some Field-Sport; for the benefit of such, this following Invention is very proper and Delightful. When you perceive an *Eye* of *Pheasants*, or *Covey* of *Partridges* to Haunt such a *Ground*, go thither, and in some place thereof distant from any *Hedge*, *Bush*, or *Gate*, about forty or fifty Paces pitch up four *Sticks*, each a *Foot* long in a Square; and in the middle of the Sticks scatter four or five handfuls of *Oats*, *Barly* or *Wheat*; and as you walk through the Ground from the Sticks, scatter a few *Corns*, which may serve as a Train to draw on the *Game*, to the great heap in the midst of the Sticks. The *Pheasants* or *Partridges* coming to feed according to their use, will soon find out the Train, and consequently the great *Bait*. The next Morning they will not fail to return thither in hopes of another Repast, against which time let it be laid ready for them, and pitch up by every one of the four Sticks a Bush of *Furz*; if they eat the second time (which you may discern by their Dung) notwithstanding the *Furz Bushes*, then against the next coming cross some *Lines* of *Packthread* in Form of a *Net*, and if for all this they come and Eat, you may be assured to take them when you please, with this following Device.

Take away the *Sticks*, *Furzbushes*, and *Packthread*, and then pitch the *Net* as is here described.

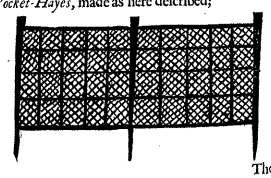


The four main Supporters of the *Net*, *A*, *B*, *C*, *D*, must be fixed strong in the *Ground*, that the *Net* may be light spread on the Top. The four Sides of the *Net* must be ordered in the same manner as shall be now directed by the Example of one of them, according to the description in the said *Figure*. Lift up the Side of the *Net* designed by the Letters *E*, *F*, over the Top of the *Net* that is spread; for the Side must not lye flat, but stand sloping like a *Pent-House* supported by small *Twigs*; the Bottom fastned in the *Earth*, and the *Cord* or *Verge* of the *Net* resting on them; then place the four *Furz-Bushes* at each Corner of the *Net*, the more to embolden them; and be sure the *Runing Cord* of the *Net* be exact and right, the two Ends whereof must be tyed to a strong *Cord*, designed by the Letter *G*, which *Cord* must reach to the next *Bush* or *Shelter* where you lye concealed, but within view of the *Net*. When all is fixed, spread your *Bait* as formerly; but try once or twice how the *Net* will draw, that upon occasion all may be in good Order. The best time to wait their coming is at *Day-break*, when they are all busie in Eating the *Bait*; then draw your *Line* with a quick Motion, and presently fix it to the *Bush* where you are, and make all possible haste to the *Net*, to prevent their escaping.

If you have a desire to preserve a Breed in your Grounds, then kill the *Cocks* and keep the *Hens* until towards *Lent* in some convenient Room, and then put them out into your *Grounds*, and they will soon find *Cocks* for a Breed.

To take Pheasants *without hurting them, for preserving the Breed.*

FOr taking some alive without hurting, for the storing your *Grounds*, or accomodating a *Friend*; having found their Haunts (which is easie to be done by their *Calls*, *Crowing*, and little *Paths* which they make, especially in the *Dew*) then place your self for the better view on some *Tree* without Noise; and when you find they are there, strew a little *Barley*, *Oats*, or *Wheat* in those little Tracts for a *Train*, and in some likely place lay five or six handfuls together, to which they will come, as being drawn thither by the *Train*; then provide for them after this manner: Plant your *Pocket-Net*, described by the last *Figure* in the *Eighth Chapter*, the Use of which is in the said *Chapter* at large treated of. You may set two or three of them in other places, and plant cross their *Walks* some short *Nets*, called *Pocket-Hayes*, made as here described;



They

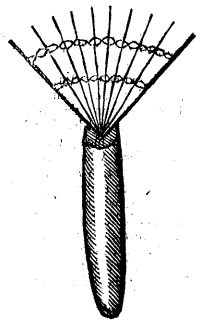
They are about a *Yard* long, and sixteen *Inches* deep. You may also in other *Paths* place three or four of your *Collars* of *Horse-hair* in certain fit Passes athwart their *Paths*, to take them by their *Legs*, and be sure to watch out very narrowly; the first that is taken will struggle hard to get off, so that speed is required to prevent it; he will also make a great Cry, which may occasion the frighting away the rest that are near at hand, so that nimblenes is required; besides, if any be taken by the *Strings*, they will hazard the breaking the *Lines* and their own *Legs*; and you should not forget to Bait the *Passes* to the several *Snares*.

Of Driving of Pheasant Powts.

FOr the Driving and Taking young *Pheasants*, called *Pheasant Powts*, in *Nets*, observe these Directions.

Having by your Diligence and Skill found out an *Eye* of *Pheasants*, place your *Nets* cross the little *Pads* and *Ways* that they have made, which are much like *Sheep-Tracts*; and if possible, you should find out one of their principal *Haunts*, which may easily be known by the bareness of the *Ground*, their *Mutings*, and the *Feathers* that will lye scattered about; and always take the *Wind* with you, for it is their custom to run down the *Wind*; place the *Nets* hollow, loose, and Circular-wise, the Nether part thereof must be fastned to the *Ground*, and the Upper-side lying hollow, loose, and bending, so that when any thing rusheth in, it may fall and entangle it.

Having so fixt your *Nets* go to the *Haunts*, and with your *Call*, if you find the *Eye* scattered, Call them together; and when you find that they begin to *Clock* and *Peep* one to another, then forbear *Calling*, and take an Instrument, called by some a *Driver*, which is made of good strong *white Wands*, or *Osiers*, such as *Basket-Makers* use, which must be set in an Handle, and in two or three places; it must be twisted or bound about with small *Osiers*, according to this *Figure*.



With this *Driver*, so soon as you see the *Pheasants* gathered together, make a gentle Noise on the *Boughs* and *Bushes* about you, which will so fright them, that they will get all close together, and run away a little distance, and stand to hearken; then make the same Noise again, which will cause them to Run again; and observe the same way until you have driven them into your *Nets*, for they may be drove like *Sheep*. But if it happen that they take a contrary way, then make a raking Noise, as it were in their Faces, which will presently turn them the right way, as you would have them.

Observations in Driving.

IN using the *Driver* there are two chief things to be observed; The first is *Secrecy*, in keeping your self from their sight, for if they espy you they will run and hide themselves in Holes under *Shrubs*, and will not stir till *Night*: And the other thing is *Time* and *Leasure*; for rashness and too great haste spoils this, and indeed any other Sport.

To take Pheasants *with the Lime Bush, or Lime Rods.*

IN taking *Pheasants* this way, you must know their *Haunts*; and be provided with good strong *Bird-Lime*, and trim them therewith according to *Art*.

The *Lime Bush* used for this purpose should not contain above eight *Twigs*, and should be the Top Branch of a *Willow-Tree*, with an indifferent long Handle, made sharp to stick into the *Ground*, or into some *Shrub* or *Bush*; and it were not amiss if you planted your *Bush* near that Branch of a *Tree* that the *Pheasant* useth to Perch upon; and you should be furnished with two or three of them, to fix up and down for the surer taking them.

The use of the Lime Bush.

WHen you have placed these *Lime Bushes*, take forth your *Call*, and use it as before directed, keeping your self secretly and in one place, until you have enticed them about you; which will not be long, if your *Call* is good, and that you are expert therein: And as they are taken by the *Rods* on the Ground, so you will surprize them with your *Bushes*; for being scared from below they will take *Perch*, as is natural unto them, to see what becomes of their Fellows; and when one is *Limed*, what by her striving and strugling, and by the rest coming and gazing, to see what is befallen her, the rest will be in danger of being *Limed*.

It is the nature of old Cock *Pheasants* when you call, to come flying from *Pearch* to *Pearch* till they come near you, and not to run upon the *Ground*, especially in the *Winter Season*, which is the chiefest time for the using the *Lime Bush*, and as soon as they light on any of those

Pearches

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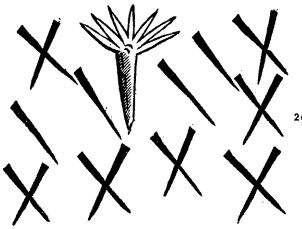
Pearches where your *Lime Bushes* are placed, upon the least touch they will be taken.

It is very requisite to count all your *Lime Rods*; for when you have gathered up all the *Pheasants*, and see what *Rods* are wanting, you may conclude that some *Pheasants* are run with them into the *Bushes*; so that it will be necessary to have a good *Staunch Spaniel*, that is well trained up to *hunt*, and bring his *Game* to you with a soft Mouth without hurting it.

The Form of the Lime Bush and Rods.



THese *Rods*, as well as the *Bush*, may be placed upon *Bushes*, *Shrubs*, and *Trees*, as well as upon the *Ground*, and in any open place where any *Bird* must pass from one place to another.

The *Lime Rods* must be set slope-wise, and for the generality cross one another, and not only one way, but the quite contrary way, so that the Points be severed agood distance from one another, and place them in Rows; which being duly observed, no *Fowl* can come any way but they must be in danger of touching: And, for a Caution, place them not too thick, for that will occasion fear in them, so that you will lose your labour.

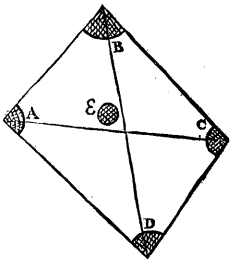
The Season to be observed for the use of the Nets, Lime Bush, and Rods.

THe Use of the *Nets* is from the beginning of *May* till the latter end of *October*.

The use of the *Lime Bush*, and *Rods*, is for the Winter Season; *viz.* from the beginning of *November* until *March* or *April*, so that there is no time of the Year (but their *Breeding* time) but that they may be taken in.

To take Pheasants *with a Cocking-Cloth, in Crowing time.*

TAke a Cloth of *course Canvas* about an *Ell* square, which put in a *Tan-Pit* to colour it, which will be soon done; then *hem* it about, and to each Corner of the *Cloth* sow a piece of *Leather* about three *Inches* square, and put two *Sticks* to go cross-wise to keep it out, as *A*, *B*, *C*, *D*, and there must be a Hole in the *Cloth* to look out of, as *E*; the *Figure* describeth it.



And being provided with a small short *Gun*, when you are near enough hold out the aforesaid *Cloth* at Arms end, and put the Nosel of the *Gun* out of the *Hole*, which serves as a Rest for the *Gun*, and so let Fly, and you will seldom miss; for *Pheasants* at this time will let you come near them, and the *Cocks* will be so bold as to fly at it.

In this Season the *Pheasants* use *Hedge-rows* and *Coppices*, and by their Crowing you will know where to find them.

Another way to take Pheasants.

BY an experienced *Sports-man* amongst divers ways to take *Pheasants*, this following way is found most Effectual for the taking them in the *Winter-Season*, provided there is no *Snow*.

Be provided with a *Net* in the shape of a *Casting-Net*, but larger, with the *Meshes* about five *Inches* wide. Then take some *Pease* or *Wheat*, and knowing their *Haunts*, which will be in young *Coppices* about three or four years growth, and in such places seek out their *Paths* and their *Dropings*, that is, their *Dung*; these *Paths* generally lead from the Young *Coppices* to those that are Older; and having found any *Path* out, lay about a Pint of the *Corn* in a place, observing where you lay it, so that they may come to eat. Thus do for several days for about a Fortnight, by which time they will be so accustomed to it, that they will come to expect some Food; and by this means all or most of the *Pheasants* in that part will be gathered to it. Having thus trained them to it, and that you certainly know when you come in the Morning that they have been there, which you will find by their *Eating*, and by their Dung: Then in such places set your *Nets*, that is, one in a place, which is thus done. Tye the Top of your *Nets* to a *Bough*, then spread it at the Bottom and Peg it down to the Ground on all parts except one, which must be raised up about a Foot and an half, like an Arched *Door*, with an *Ashen-Stick*; then fix to the said *Arch* several *Rods* made of *Hasel*, with the Taper Ends to the *Earth* within the *Net*, so that the *Pheasants* may come in by parting the *Sticks*, but not go out again.

Having

Having thus set your *Nets*, which must be made of course *Thread*, such as *Rabet Hayes*, and of a *Tand-colour* (by putting it into a *Tan-Pit*,) cover your *Nets* with *Boughs*, to prevent others from finding them, and be sure to set them some distance in the *Wood*.

CHAP. X.

How to take Quails, More-Powts Rails, &c. *with Calls; with directions to made the said Calls; as also with Nets.*

THe best way to take these *Birds* as well as those aforesaid, is to know their *Haunts*, and to learn their perfect *Notes* on the *Call*.

The *Quail* delights in *Corn-Fields* and *Mowing-Grass*. The *More-Powt* in *Heaths* and *Forests*, and the *Rails* in long *Standing-Grass*, where they may lye obscure.

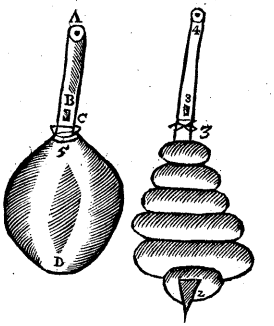
Quails are to be taken by *Calls*, whilst they are in their Wooing, which is from *April* to *August*. The *Quail* will Call at *Sunrising*, about Nine a Clock, about Twelve, about Three in the Afternoon and at *Sun-set*. The *Notes* of the *Cock* differ much from the *Hen*, so that you must be expert in both if you intend to do any good in taking them; and when you hear the *Cock* Call, Answer in the *Hens* Note, and so contrary-wise Answer the *Hen* in the *Cocks*, and thus you will have both come to you, so that you may cast over your *Net* and take them.

If it be a single *Cock-Quail* he will come at the first *Call*; but if he have a *Hen* with him, he will not forsake her. Sometimes you shall hear only one to answer your *Call*, yet Three or Four will come to the *Net*, so that you need not make too great hast when you find one entangled, for in a short time some more may be taken.

Quails are a neat cleanly *Bird*, and will not much run in *Dews* or *Wet Places*, but choose rather to fly, that they may not dirty themselves; you must therefore at such times place your self as near your *Net* as possible.

If by Accident the *Quail* passeth by one end of the *Net*, lye close for some time and let her go a little way, then gently remove your self on the other side of the *Net*, and *Call* her back again, and she will soon come to your *Net*.

The Form of the Calls, and how to make them are as follows.



THe first is made of a *Leather-Purse*, about two *Fingers* wide, and four long, in fashion like a *Pear*; It must be stuft half full of *Horse-hair* in the end marked with the *Figure* 5, fasten a small Device marked *C*, made of a *Bone* of a *Cats*, *Hares* or *Coneys Legs*, or of the Wing of a *Hen*, which must be about 3 *Fingers* long, and the end *C* must be formed like a *Flagelet*, with a little soft *Wax*; also put in a little to close up the Hole *A*, which open a little with a *Pin*, to cause it to give the clearer and shriller Sound. This *Pipe* fasten in your *Purse*, and then to make it speak hold it full in the Palm of your Hand, and place one of your *Fingers* over the place, marked 5; you must strike on the place *D* with the hinder part of your left *Thumb*, and so to counterfeit the *Call* of the *Hen Quail*.

The other *Quail Call* must be 4 *Fingers* long, made of a piece of *Wyer*, turned round in such form as the *Figure* describes. It must be covered over with *Leather*, and one end thereof closed up with a piece of flat *Wood* marked 2; about the middle you must have a small *Thread*, or *Leather-Strap* wherewith you may hold it, so as to use it with one *Hand*, and at the other end place just such a *Pipe*, as was described before in the making up the first *Call*.

Now for the *Calling* with it, hold the *Strap*, or piece of *Leather*, with your left *Hand* close by the piece of *Wood No.* 2, and with your right *Hand* hold the *Pipe* just where it is joyned to the *Flagelet No.* 3.

The *Net* to be used should be made of *Silk*, or very fine *Thread*, about Twelve yards square, with a Hole in the midst, large enough to fit in, so that when the *Quail* comes within the Compass of the *Net*, your rising up will cause her to fly, and so she will be taken: The places to pitch these *Nets* must be in *Corn-Fields*, as *Barley*, *Oates*, or the like.

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Another way to take Quails.

THere is another way to take *Quails* with the same *Calls*, but with a different *Net*, made also four Square, about Twenty or Two and Twenty *Foot* every way, and of *Green Silk* or *Thread*, with a couple of strong *Straps* at any two of the Corners. There must be two in company to use it, and each must hold one of the said *Straps*, when they use the *Net*, and so to draw it over the *Quails*, the bottom hanging a little on the *Ground*. The manner is that when you hear any *Quail Call*, listen exactly whereabouts it is, and go softly thither; if it *Call* no more, give it a light touch with your *Pipe*, to make it speak. This way is most fit to be used in *Standing-Grass*, or in *Stubble-Fields*.

You must have a nimble *Ear* to discern the place, and so go thither with your *Net* drawn, and when you are just at it, let fall, and beat with your *Hat*, or the like, to cause it to rise, and by this means you may take many in a day.

If you are alone then pitch your *Net* in such manner as the Fore-part may rest clear from the *Ground* about Eight or Nine *Inches* by the help of the *Bent-Grass*, or some small *Sticks*; then give a *Call*, and they will come under the *Net*.

If you set against the *Morning*, fix your *Rods* over Night, and set the *Lines* at least an hour before Day; for if you go later, 'tis twenty to one but the *Fowl* will be there before you; and if you set for the Evening, all must be fitted by *Sun-Set*, or before, lest the *Birds* finding you there do avoid the Place: And 'tis not amiss that in all these places you embolden the *Fowl* by strowing some *Baits* to entice them thither.

If you set in the *Water*, yours *Lines* should be not above five or six *Inches* out of the *Water*, that the *Fowl* may not touch on them as they *Swim* to and fro; and you may then fix one end of your *Line*, and only let the other end be with a runing *knot*, and so you may be assured of finding what you take. If you set over any *Water*, your *Sticks* must be longer or shorter according to the depth of the place. In light *Nights* this Device is not so good, but in dark and great *Fogs* it is excellent, for you need not watch them, only repair thither every *Morning* and *Evening*, and when you have tried one place you may remove to another *Haunt*, and still preserve and supply your *Sticks*, *Lime*, and *Lines* as you see occasion.

It were not amiss in case you set for *Water-Fowl*, that some of your *Lines* be about two Foot high above the *Water*, to enshare the *Fowl* as they make their flights, not before they descend into the *Water*; for you cannot but have observed that they use to fly about that distance at such times.

CHAP. XI.

Concerning the taking Birds great and small, especially Wild Fowl with Lines, Springs, Strings, Bird-Lime, &c. in Woods, Meadows, Splashes and the like.

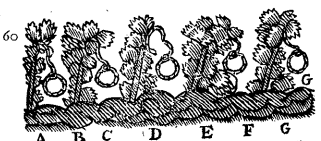
WHen you have found out any place where *Fowl resort*, either great or small, observe this Device. Get a good *Bundle* of *Sticks* sharpned at one end, and forked at the other, and about a *Foot* in length; stick these into the *Ground* slightly, only to bear up the *Lines* or *Cords* of which we come now to speak, and the *Sticks* must be placed in strait Lines, and at equal distances over the whole *Haunt* where they resort. You must get such a proportion of *Pack-Thread*, or small *Cord* as you intend to use, which must be daubed all over with strong *Bird-Lime*, if it be for strong *Fowl*, or that you use it in the *Water*, otherwise ordinary *Bird-Lime* may serve. Your Rows of *Sticks* should not be above Two Yards distance from each other, and the *Sticks* of such proportions as to support your *Lines*, which must be laid all along over the *Forks*. You must fasten the ends of your *Lines* to your last *Sticks* with *slipping-knots*, that when any *Bird* comes to touch on any part of the *Line*, the whole *Line* may give way to enshare it, so that the more the *Fowl* striveth to get away, the more fast it becometh.

CHAP. XII.

How to take Fowl and Birds by the Legs, Necks, or both in Nooses made of Horse-Hair with runing Knots.

THe Devices to take *Fowl* and *Birds* by the *Necks* or *Legs* and sometimes by both, is very sure; the most fitting places for this purpose are amongst *Bushes* and small *Coppices*, and the manner is thus; Make as many little *Hedg-rows* of about half a Foot high (by sticking small *Furz Bushes*, *Brambles*, *Thorns*, or the like in direct or crooked Lines, and of such length and in such number as you think fit, and according to the *Game* you think the place may afford.)

At several distances leave little open Spaces big enough for the *Birds* to pass through. This ensuing *Figure* represents unto you the same.



The

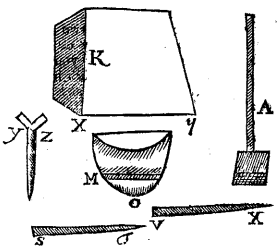
The Letters *A, B, C, D, E, F, G*, represent the Passages or void Places, in each of which fix a short *Stick* of the bigness of ones *Finger*, and tye thereunto a *Nooze* of *Horse-hair* finely twisted with a slipping Knot, as the aforesaid *Noozes* do demonstrate, that the *Fowl* endeavouring to pass through may draw upon his *Neck*, and so become strangled.

For *Wood-Cocks* lay those *Strings* flat on the Ground to take them by the *Legs*; If you make the same Devices crosswise plowed *Furrows*, place your *Strings* in the bottoms thereof, you may take store of *Partridges*, provided there be any in the Ground; and for the enticing on the *Fowl* it were good to scatter in and about the *Knots* or *Noozes* some *Grain*.

CHAP. XIII.

Directions to take small Birds *in* Pit-Falls.

HAving given Directions for the taking *Partridges* with *Pit-Falls*, I shall now proceed to some of the like Nature for the taking small *Birds*, but the former was above the Earth, these in and under it, and are excellent for taking *Blackbirds*, *Thrushes*, *Feldivares*, and such like *Birds* that feed on *Worms*. The best Season for this Sport, is from the beginning of *November*, to the end of *March*; the Device is cheap, profitable and so common, that scarce any Schoolboy but what is acquainted therewith; however these ensuing *Figures* will demonstrate it unto you.



The *Figure* marked *A* is a plain *Paddle Staff*, such as *Countrymen* use to carry in their Hands as they go about their Grounds; with this you are to cut the *Turfs*, wherewith the *Pit-Fall* is to be closed, which *Turfs* must be cut at least two *Inches* larger than the *Pit*: The same *Paddle* may likewise serve to dig your *Pits*, which should be always made in the *Sun*, near some *Hedge* where *Birds* frequent. They may be also made in great *Woods* near some *Holly Bushes*, for in hard Weather *Birds* use to resort to such places in expectation of *Worms*, by pecking up and removing the Dead *Leaves* that lye on the *Ground*. The *Holes* may be about seven *Inches* deep, on the opposite side let it be about four or five *Inches* long, as is designed by the letter *O*, and from *X* to *O*, there may be a Distance of about six *Inches*. Then take a small Stick *V, X*, not quite so big as ones little *Finger*, and about five *Inches* long, which cut sloping at the end *V*, the other Part of the *Stick* toward *X* being Tapered, or cut small by Degrees: Prick the small end *X* into the side of the *Pit* marked *M*, and let the end *V* lye upon the Ground. Then have another *Stick* marked as *S, T*, about the bigness of a *Swans Quill*, and four *Inches* long; which cut flat and smooth on one side, and at the end *S* on the other side cut a Notch.

In the next place you must have a forked *Stick* marked, as *T, Z*, somewhat bigger than the other *Sticks*, and about five or six *Inches* long; the end *Z* being cut like the end of a *Wedge*.

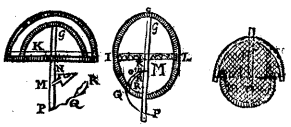
Your next business is to make use of your *Turf*, which must be four or five *Inches* thick, the bigger side to be laid over the largest side of the *Pit*.

Take the end *S*, of your little *Stick*, and lay the flat side on the place *M*, upon the end of the *Stick*, which is pricked into the Ground; then place the end *Z*, of your *Forked Stick* into the Notch *S*, and lay on the *Turf*, making the end of the *Forked Stick* marked *T*, to be just under the place of the *Turf* marked *X*; then move and place the small *Stick* which holds the *Fork* in such manner, that the least *Bird* that comes to tread upon the end of the *Stick T*, the *Turf* may fall down, and so ketch the *Bird* in the Hole.

For inticing the *Birds* to come to your *Pit-Falls*, get some *Earthworms* and stick four or five of them through the *Body* with some long *Thorns*, or small *Sticks* for that purpose, and so set them in your *Pits*, to be seen by the *Birds* that come near it; and be sure that the *Birds* can't come to the *Pits* any other way than by that marked *O*; you may Plant a little *Hedge-Row* of short *Sticks* about the two sides of the *Pit*.

If in hard *Frosty Weather*, stir up some fresh *Earth* about the Fore-front of the *Pit*, which will much entice *Birds* to come.

There is another kind of *Pit-Fall*, which is not so Troublesom as the former, nor so many *Sticks* or Devices required, you may use it in any *Hedge*, *Bush*, *Tree* or the like, and in all *Weathers*. It is to be made and used after this manner, as it is here described.



Take a *Holly Stick* about the bigness of ones middle *Finger*, and about a *Foot* and a half long;

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ly that of *Wheat* from the middle of *October* to the end of *March*, and that after this manner.

About Nine a Clock at Night, the *Air* being Mild, and the *Moon* not Shining, take your *Low-Bell* which must be of a deep and hollow Sound, and of such a reasonable size, that a Man may carry it well in one Hand; which *Towl* just as a Sheep useth to do whilst it Feedeth. You must also have a *Box* much like a large *Lanthorn*, and about a *Foot* and a half Square, big enough for two or three great *Lights* to be set in; and let the *Box* be Lined with *Tin*, and one side open to cast forth the Light; This *Box* fix to your *Breast* to carry before you; and the Light will cast a great Distance before you very broad, whereby you may see any thing that is on the Ground, within the Compass of the Light, and by Consequence the *Birds* that Roost on the Ground. And for the taking them have two Men with you, one on each side, but a little after you, to the end they may not be within the Reflexion of the Light that the *Lanthorn* or *Box* casts forth; and each of them must be provided with a *Hand-Net* of about three or four *Foot* Square, the *Figure* represents the Form, which must be fixed to a long Stick to carry in their *Hands*, so that when either of them seeth any *Birds* on his side, he must lay his *Net* over them; and so take them up, making as little Noise as possible, and withal be not overhasty in runing to take them up, but let him that carrieth the *Light* and *Low-Bel* be the foremost, for fear of raising others, which their coming into the Limits of *Light* may occasion, for all is dark except where the *Light* casts its Reflexion, so that by no means there must not be any *Light*.

Note that the sound of the *Low-Bell* doth cause the *Birds* to lye close, and dare not stir whilst you put the *Nets* over them, and the *Light* is so terrible unto them, that it amazeth them. And for Caution you must use all imaginable Silence, for fear of raising them.

If you would use this Sport by your self, then in one hand carry the *Low-Bell* as before directed, and in the other a *Hand-Net* about two *Foot* broad and three *Foot* long, with a Handle to it, made as the *Figure* represents, which is to lay upon them still as you espye them, and some like this way better than the former.

If you have Company with you, one may have a *Birding-Piece*, to the end that if you espye a Hare, the best way is to shoot it, for it is hazardous to take it with the *Net*.

Some there are that instead of fixing the *Light* to their *Breast* as aforesaid, do tye the *Low-Bell* to their Girdle by a String that hangs to their Knees, and their Motion causeth the *Bell* to strike; and then they carry the *Light* in their Hand, extending their *Arm* before them, but the *Lanthorn* or *Box* must not be so large as that which you fix to your *Breast*. Your best way is to try both, and use that which liketh you best.

CHAP. XVI.

The way to take Small Birds, called Bat-Fowling.

Bat-Fowling is likewise a *Night* Exercise, and takes all sorts of *Birds* both great and small that *Roost* not only on the *Ground*, but on *Shrubs*, *Bushes*, *Hathorn Trees*, and the like places, and therefore propet for *Woody*, *Rough*, and *Bushy Places*.

In the Depth of *Winter* is the best Season for this Sport, and the darker the *Night*, and the colder the *Weather*, 'tis so much the better.

For the manner of *Bat-Fowling*, it may be used with *Nets*, or without, according to your Pleasure and Fancy. If without, suppose your Company be twelve or fifteen, let one Third Part carry *Poles*, to which little Bundles of dry Wisps of *Hay* or *Straw* (or instead thereof pieces of *Links*, or *Hurds* dipt in *Pitch*, *Rosen* or the like that will blaze) must be bound at top; another third part must attend upon the said *Fires*, with long *Poles* Rough and Bushy at the upper ends, to knock down the *Birds* that fly about the *Lights*; and another third Part must have long *Poles* to beat the *Bushes*, and other places to cause the *Birds* to fly about the *Lights*, which they will do as if amazed, not departing from it; so that they may be knock't down at Pleasure. And thus you may spend as much of the *Night* as is dark, and find good Divertion.

It will be convenient for one in the *Company* to carry a *Candle* and *Lanthorn*, that in case all the *Lights* are Extinguished, they may be kindled at Pleasure; And be sure to observe the greatest Silence imaginable, especially till the *Lights* are kindled.

The other way with *Nets* is thus done, Let two or three go with *Lanthorns* and *Candles* lighted, extended in one of their *Hands*, (just such as before described to carry in your Hand, in the *Chapter* of the *Low-Bell*,) and in their other *Hands* small *Nets*, something like a *Racket*; but less, which must be fixed at the end of a long Pole, to beat down the *Birds* as they sit at Roost; which being surprized with the great blazing *Light*, will sit until they are knockt down; then there are others whose Business is to gather the *Birds* up, and to put them into a *Basket* or *Bag* to carry home.

A *Cross-Bow* for this Sport is very useful, to *Shoot* them as they sit.

CHAP. XVII.

Of the Tramel-Net, *and its use.*

There is another way to take great and small *Fowl* by Night in *Champain Countries*

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and that is with a long *Tramel-Net*, which is much like the *Net* uſed for the *Low-Bell*, both for *Shape*, *Bigneſs* and *Meſh*.

This *Net* is to be ſpread upon the Ground, and let the neither or further end thereof (being Plummed with ſmall *Plummets* of *Lead*) lye looſe on the Ground; and then bearing up the former end by the Strength of Men at the two formoſt ends, only Trail it along the Ground, not ſuffering that end which is born up to come near the Ground, by at leaſt a Yard.

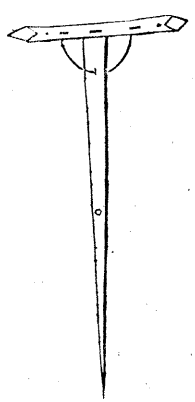
Then at each ſide of the *Net* muſt be carried great Blazing *Lights* of Fire, ſuch as were formerly ſpoken of; and by the *Lights* Men muſt be with long *Poles* to raiſe up the *Birds* as they go; and as they riſe under the *Nets* ſo to take them. And in this manner you may go over a whole *Corn-Field* or other *Champain Ground*, which will afford both Pleaſure, and Profit.

CHAP. XVIII.

Of the Sparrow-Net, *and its uſe.*

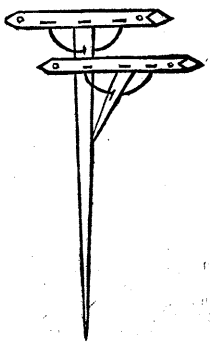
THe *Sparrow-Net* is an Exerciſe uſed after *Sun Set*, and before *Sun Riſing*, being the times after the *Birds* go to Rooſt; and before their ſtiring in the *Morning*.

The *Engine* or *Sparrow-Net* is to be thus made, firſt have a long *Pole* much like a *Hawks Pole*, and at the upper end muſt be faſtned ſtrongly either with one, two, or more *Grains*, a ſmall ſquare croſs piece of Wood like to the Head of an ordinary *Hay Rake*, but much larger for length and ſize, and of a little longer Square, according to the Faſhion of this following *Figure*.



Then make another *Staff* like unto this, but not above a third Part in length, and joyn it to the longer with a ſtrong ſmall *Cord*, ſo looſely that at pleaſure it may fall too and fro from the longer *Croſs-Staff*; and when both the *Croſs-Staves* meet together, they may be both of one equal Length and Height, and joyn together without any difference, for otherwiſe they will be out of order; and ſo be ineffectual.

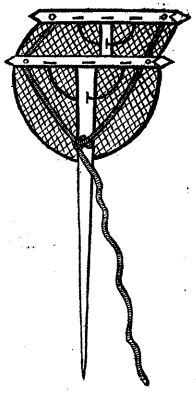
The Form and manner of the Second Croſs-Staff.



THeſe two *Croſs-Staves* being thus joyned fit to meet together, fix both to the one and the other a large and wide *Purſ-Net*, having that Liberty at the top, that the *Croſs-Staves* may fall and part the one from the other a pretty diſtance; and the lower end of the *Net* muſt be ſtreight and narrow, and made faſt to the ſame Hole in the lower *Croſs-Staff*, to which the ſhorter *Croſs-Staff* was before faſtned; then take two ſmall *Cords*, or *Lines*, which muſt be faſtned with knots to each of the ſhorter *Croſs-Staves*, paſſing through the two Holes, and ſo through the Holes of the lower *Croſs-Staff*, through which they may go and come at Pleaſure; and then ſhall the two ends of the Wards be tyed on a knot together, at ſuch an even Diſtance, that the ſhorter *Staff* may fall at pleaſure from the lower as far as is convenient, or the wideneſs of the *Net* permit; and then another ſingle *Ward* being made faſt to that laſt knot of the two *Cords* (which ſingle *Ward* always carry in your right Hand) draw the *Croſs-Staves* cloſe together, and cloſe up the *Net* as you find occaſion; and make with it the *Staves* and *Net* fly open, and widen as the place requires where you are to ſet it.

The

The Form and Manner of the Sparrow-Net, *as it is fixed together.*



THis *Sparrow-Net* is to be uſed Early in the *Morning*, or Late at *Night* as before Noted, and muſt be ſet, or fixed againſt the Eaves of *Houſes*, *Barns*, *Dovehouſes* and ſuch like places, as alſo againſt Stacks of *Corn* or *Hay*; and if they were thatcht it were the better, and being ſet cloſe againſt them to knock and thruſt the *Croſſ-Staves* cloſe againſt the ſame, making a noiſe to force them to fly out into the *Net*, and immediately draw the long ſingle *Line*, and ſhut up the *Croſſ-Staves* cloſe; and ſo take out the *Birds*.

The chief Beneſit of this *Net* is either to deſtroy the *Sparrows* that lye about your *Tards*, *Orchards*, and *Fields*, devouring the *Corn* and ſpoiling the *Fruit*, or for the *Mewing* of *Hawks*, or getting ſuch as are Weak and Sick into Strength; for with this *Net* you may take *Morning* and *Evening* ſuch quantities as are ſufficient to give them warm to your *Hawks*, which is a great Nouriſhment, and makes them *Mew* faſter; or if for a weak Perſon, enough to make ſome *Broath*.

CHAP. XIX.

How to take Wild Fowl with a Net, *called a* Crow-Net.

THere is an Invention for taking *wild Fowl* in Winter with the *Crow-Net*, which may be uſed in the *Day* time. It is made of double Twiſted *Thread*, or fine *Packthread*; the *Meſhes* ſhould be two *Inches* wide, the length about ten Yards, and three in depth; It muſt be verged on the ſides with good ſtrong *Cord*, and extended out very ſtiff upon long *Poles* made for that purpoſe.

When you are on the place you intend to ſpread your *Net*, open it, and lay it out at its full Length and Breadth; then faſten the lowet end of the *Net* all along on the *Ground*, ſo as only to move it up and down. The upper end of the *Net* ſhould ſtand extended on the long *Cord*, the further end thereof being Staked faſt to the *Earth* by a ſtrong *Cord* about five *Yards* diſtant from the *Net*, which *Cord* place in an even *Line* with the lower edge of the *Net*; the other End of the *Cord* muſt be at leaſt twenty five *Yards*, to reach unto ſome *Natural* or *Artificial Shelter*, by the help of which you may lye concealed from the *Fowl*, otherwiſe you can expect no good Succeſs.

Your *Net* muſt be in that exact order, that it may give way to play on the *Fowl* upon the leaſt pull of your *Cord*, which do ſmartly leſt the *Fowl* be too quick for you.

This Device may be uſed for *Pigeons*, *Crows*, or the like, in *Corn-fields* newly Sown; as alſo in *Stubble-fields*, provided the *Stubble* conceal the *Net* from the *Fowl*.

It may alſo be uſed for ſmall *Birds*, as *Barn-Doors*; but then lay for them ſome Train of *Corn* or *Chaff*, to entice them to the *Net*, lying concealed.

This *Crow-Net* may alſo be ſpread to great pleaſure and profit in the *Mornings* and *Evenings*, where you know their *Haunts* are; at which times in hard *Weather Fowl* uſe to fly in great *flocks* to and from the *Land*, with and againſt the *Wind*; and then they fly cloſe to the Ground in open *Countries* and *low Lands*, which generally are not full of *Incloſures*; and when they are within reach of your *Net*, let go, and it riſeth over them, and brings them back to the *Ground* with a notable Blow.

CHAP. XX.

Of the Day-Net, *for taking of Birds.*

THis *Day-Net* is generally uſed for taking ſuch ſmall *Birds* as play in the *Air*, and will ſtoop either to *Stale*, *Prey*, *Gig*, or the like, as *Larks*, *Linnets*, *Buntins*, &c.

The Seaſon of the *Year* to uſe this *Net* is from *Auguſt* to *November*, and the beſt time is very Early in the *Morning*; and by the way obſerve, that the milder the *Air*, and the brighter the *Sun* is, the better will your Sport be, and of longer continuance.

As to the Placee where to lay your *Net*, let it be *Plain* and *Champain*, either on ſhort *Stubbles*, green *Leys*, or flat *Meadows*, near *Corn-fields*, and

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and ſomething remote from *Towns* or *Villages*; be ſure let your *Net* lye cloſe to the Ground, leſt the *Birds* creep out, and make their eſcapes.

The faſhion of this *Net* appears by the following *Figure*; and 'tis made of fine *Packthread*, with a ſmall *Meſh*, not exceeding half an *Inch* ſquare; the length muſt be three *Fathom*, and the breadth but one; the ſhape is like the *Crow-Net*, and muſt be verged about after the ſame manner with a ſmall, but ſtrong *Cord*, and the two ends extended upon two ſmall long *Poles*, ſuitable to the breadth of the *Net*, with four *Stakes*, *Tail-Strings*, and *Drawing-Lines*.

This *Net* is compoſed of two, but are both of one length, breadth and faſhion, and are to be laid oppoſite to each other, ſo cloſe and even, that when they are drawn and pulled over, the Sides muſt meet and touch each other.

This *Net* Stake down with ſtrong *Stakes* very ſtiff on their *Lines*, to the end you may with a nimble Twitch caſt them too and fro at pleaſure. Then faſten your *Drawing-Cords*, or *Hand-Lines*, (which muſt be at the leaſt a Dozen, and each two *Yards* long) to the upper end of the foremoſt *Staves*, and ſo extend them of ſuch a reaſonable ſtreightneſs, as with little ſtrength they may raiſe up the *Nets*, and caſt them over.

When your *Nets* are thus laid, place your *Gigs* or *playing Wantons* about twenty or thirty *Paces* beyond, and as much on this ſide your *Nets*. Theſe *Gigs* muſt be faſtned to the Tops of long *Poles* and turned into the *Wind*, ſo as they may play and make a noiſe therein.

Theſe *Gigs* are certain Toys made of long *Gooſe-feathers*, like *Shettle-cocks*, and with little ſmall *Tunnels* of *Wood* runing in broad and flat *Swan Quills* made round like a ſmall *Hoop*, and ſo with longer *Strings* faſtned to the *Pole*, will with any ſmall *Wind* or *Air* move after ſuch a manner, that *Birds* will come in great flocks to wonder and play about them. The following *Figure* ſheweth the ſame.

Your *Gigs* being placed, then place your *Stale* (which is a ſmall Stake of *Wood* to prick down into the *Earth*) having in it a *Mortice-Hole*, in which a ſmall, long and ſlender piece of *Wood* about two *Foot* long is ſo faſtned, that it may move up and down at pleaſure; and to this longer *Stick* faſten a ſmall *Line*, which runing through a *Hole* in the aforeſaid *Stake*, and ſo coming up to the place where you ſit, you may by drawing the *Line* up and down with your *Right-hand*, raiſe up the longer *Stick* from the *Ground*, as you ſee occaſion.

To this longer *Stick* faſten a live *Lark*, or ſuch like *Bird*, which with the *Line* making it to ſtir up and down by your pulling, will entice the *Birds* to come to your *Net*, and ſo are taken.

There is another *Stale*, or Inticement, to draw on theſe *Birds*, which is called a *Looking-Glaſs*, and that is a round Stake of *Wood* as big as a Mans *Arm*, and made very ſharp at the lower end to thruſt it into the *Earth*. It is made very hollow in the upper part above five *Fingers* deep, into which hollowneſs is placed a Three-ſquare Piece of *Wood* about twelve *Inches* long, and each Square two *Inches* broad, lying upon the Top of the *Stake*, and going with a *foot* into the *hollowneſs*; which ſaid *foot* muſt have a great Knob at the Top, and another at the Bottom, with a deep ſlenderneſs between; to which ſlenderneſs faſten a ſmall *Packthread*, which runing through a *Hole* in the ſide of the *Stake*, muſt come up to the Seat where you ſit. The Three-ſquare Piece of *Wood*, that lies on the Top of the *Stake*, muſt be made of ſuch a true poyz and eveneſs, and the *foot* in the *Socket* ſo ſmooth and round, that upon the leaſt touch it will twerle and turn round, winding the *Packthread* ſo many times about it, which being ſuddenly drawn, and as ſuddenly let go again, will keep the *Engine* in a conſtant round Motion. Thus done, faſten with *Glew* upon the uppermoſt flat *Squares* of the Three-ſquare Piece, about twenty ſmall Pieces of *Looking-Glaſs*, and paint all the Square *Wood* between them of a light and lively *Red*, which in the continual Motion will give ſuch a reflexion, that the *Birds* will play about it to admiration until they are taken.

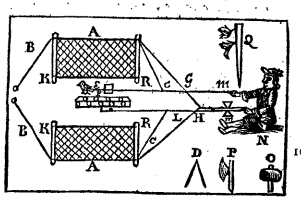
Both this and the other *Stale* are to be placed in the midſt between the two *Nets*, and about two or three *foot* diſtance from each other, ſo that in the falling of the *Nets* the *Cords* may not touch or annoy them; neither muſt they ſtand one before or after another, the *Glaſs* being kept in a continual Motion, and the *Bird* very oft fluttering.

When you have thus placed your *Nets*, your *Gigs* and *Stales*, go to the further end of the long drawing *Lines*, and *Stale-Lines*; and having placed your ſelf, lay the main drawing *Line* overthwart your *Thigh*, and with your *Right-hand* always draw the *Glaſs-Line*, and with your *Left* pull the *Stale-Line* to ſhew the *Bird*; and when you perceive the *Birds* to begin to play near and about your *Nets* and *Stales*, then pull over the *Net* with both Hands with a quick, but not too haſty Motion, for that ſpoils your Sport.

Always remember to lay behind you where you ſit, all the ſquare *Inſtruments* and *Implements* to be uſed, as the *Stakes*, *Poles*, *Lines*, *Packthread*, *Knitting-Pin* and *Needle*, your *Bag* with *Stales*, a *Mallet* to knock in the *Stakes*, and a ſmall fixed *Hatchet* to ſharpen or make new *Stakes* upon occaſion; and laſtly, be ſure that the firſt half Dozen of *Birds* you take be preſerved alive for *Stales*, for you muſt not be unprovided therewith upon no account.

Having fully treated of the *Day-Net*, this enſuing *Figure* gives you the full demonſtration and proportion thereof, being a *Net* commonly uſed by all *Bird-Men*.

For



For Explanation of this *Figure*, obſerve the ſeveral Letters which denote the Parts.

A ſheweth the Bodies of the main *Net*, and how they ought to be laid.

B the *Tail-Lines*, or hinder *Lines*, Staked to the *Earth*.

C, the fore *Lines* alſo Staked to the *Earth*. *D*, the *Knitting-Needle*. *E*, the *Bird Stale*. *F*, the *Looking-Glaſs Stale*. *G*, the *Line* that draws the *Bird Stale*. *H*, the *Line* that draws the *Glaſs Stale*. *I*, the Drawing *double Lines* of the *Nets*, which pulls them over. *K*, the *Stakes* that Stake down the four Nether Points of the *Net*, and the two *Tail-Lines*. *L*, the *Stakes* that Stake down the *fore Lines*. *M*, the *ſingle Line* with the *Wooden-Button*, to pull the *Net* over with. *N*, the *Stake* that Stakes down the *ſingle Line*, and where the Man ſhould ſit. *O*, the *Wooden-Mallet*. *P*, the *Hatchet*: And *Q*, the *Gig*.

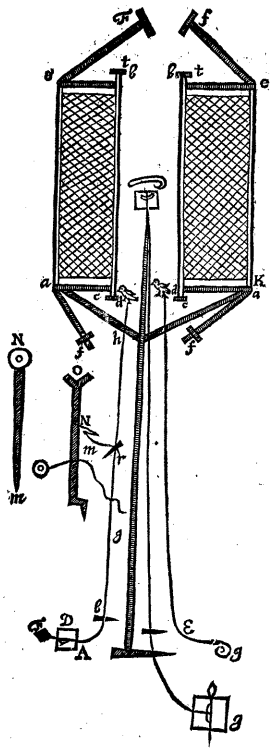
And thus much for the *Day-Net*.

How to take Larks with a Looking-Glaſs and Clap-Nets, alſo with a Draught-Net, &c.

I Have obſerved two or three ways purpoſely for the taking of *Larks*; the firſt ſhall be with a *Looking-Glaſs*, called a *Doring* or *Daring*.

I ſhall not trouble you with Inſtructions what *Bag* you ſhall uſe for the carrying the many little *Implements* uſed in this Sport, leaving it to your diſcretion; yet in place more convenient I ſhall give you two or three Forms which are moſt uſeful: Neither ſhall I trouble you with Inſtructions how to make the *Net*, which may be bought at moſt Shops that ſell *Nets*; but my buſineſs ſhall be to give you a full deſcription of the thing it ſelf.

You muſt provide four *Sticks* very ſtrait and 'ight; about the bigneſs of a *Pike*, two of which ſhould be four *Foot* nine *Inches* long, the other two five *Foot* long; they ſhould be all Notched at the Ends, as it is in thoſe *Sticks* marked with the little *a* and *b*; at the End *b* faſten on one Side a *Stick* of about a *Foot* long, of the ſame bigneſs with the other four *Sticks*, and on the other ſide a ſmall *Peg* of *Wood* marked *A*, three *Inches* long. Then provide four other *Sticks*, each a *Foot* long, as the Letter *f*; each muſt have a *Cord* nine *Foot* long, faſtned at the bigger End of them, as *e*, *f*; every of theſe *Cords* muſt have a *Buckle* at the End *e*, for the commodious faſtning them to the reſpective *Sticks* when you go about to ſpread your *Net*. This following *Figure* repreſents it.



The next thing to be provided is a *Cord a*, *k h*, *g*, which muſt have two Branches *a*, *k*, one of them muſt be nine *Foot* and an half long, the other ten *Foot*, with a *Buckle* at each End; the reſt of the *Cord* from *h* to *g*, muſt be between 22 or 24 *Yards* long.

All theſe *Cords*, as well the Long ones as thoſe with the *Sticks*, ſhould be ſtrong twiſted, about the bigneſs of ones *little Finger*.

The next thing to be provided is a *Staff m*, *n*, about four *Foot* long, Pointed at the End *m*, and at the end *n* faſten a little *Ball* of *Wood*, for the convenient carrying of thoſe many Neceſſaries in ſome *Sack* or *Wallet*. You muſt have a ſmall

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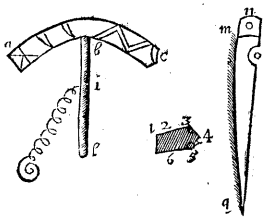
Spade of *Iron*, to level the *Ground* as you see occasion. Also have two small *Rods* like that marked *l, m, n, o*, each eighteen *Inches* long, having a great End *l*, and thereunto a small *Stick* fixed, as *p*, with a *Packthread* near the End of the said *Rod*; and about the Letter *m*, being some nine *Inches* from it, tye another *Packthread* with two Ends, each hanging cloar a *Foot* long; at each End tye a little Piked *Stick*, as *q, r*; At the smaller End of the said *Rod* tye a *Packthread* with four Doubles, which must form two *Loops*, as *o*, which tye at the Legs of some *Larks*. You must also have two small *Reels*, as *F, G*, by the help of which you may make the *Larks* fly as you have occasion. The last thing you are to prepare is a *Looking-Glass*, according to these following *Figures*.



Take a piece of *Wood* about an *Inch* and an half thick, and cut it like a *Bone*, but so as there may not be above nine *Inches* space between the two Ends *a* and *c*, and let it have its full thickness at the bottom, to the end it may receive into it that false Piece marked 1, 2, 3, 4, 5, 6, in which the *Figure 6* is the lowest, and the upper 3 is but half an *Inch* large; the five Corners 1, 2, 3, 4, 5, must be let in, to receive as many pieces of *Looking-Glass*.

In the middle of the said Piece of *Wood*, in the Bottom or Under part thereof, by the Letter *b*, make a Hole to receive a little *Peg* of *Wood*, as *l, j, b*, fix *Inches* long, and about the bigness of ones *Finger*, Pointed at *l*, and a little *Hole* in the Middle *j*. You must likewise have another Piece of *Wood n, m, o, q*, a *Foot* long, and about two *Inches* Square, sharpned at the End *q*. Make a little Ingraving in it at *o*, about two *Inches* high, and one *Inch* and an half broad; then Bore or Pierce a *Hole* into the said Piece above the End *n* to receive the *Peg r*, which must come down an *Inch* into the *Hole o*, and so turn easily about.

When it is thus fixed, put a small *Line*, into the Hole, *j* and your *Glass* is finished. You must place it between the two *Nets* near the middle of them, as the letter *j*, and carry the *Line* to the Hedge (of which hereafter) so that pulling the *Line* you may make the *Looking-Glass* play in and out as *Children* do a *Whirlegig* made of an *Apple* drawn throught a *Net*.

Always keep it turning that the twinkling of the *Glass* against the *Sun* may provoke the *Larks* to come to view it.

The true season for this Sport is from *September* to *March*, especially in cold, clear and Sunshiny Weather. When you intend to pitch your *Nets*, be sure to have the *Wind* either in front or behind your *Nets*, lest if it be on either side it hinders the playing of your *Nets*. Close some open place, and let it be remote from *Trees* or *Hedges*, at least an hundred Paces. The Ground being clear from all *Stones* and *Rubbish*, spread your *Net* in the manner described by the *Figure*, viz. The longest *Sticks* fastned to that part of the *Net* which is largest, as for Example in the *Figure*, that on your Right Hand is bigger than the other. You must drive the *Peg c* into the Ground, and pass the end *a*, of the *Stick* into the *Buckle* of one of the *Cords* of the *Net*, and the *Peg d* into the other Loop of the same End. Also do the same with the other *Stick* at the End *e, l*. But before you drive your *Peg* into the Ground strain the *Cord c, t*, as much as you can; then take two of the *Sticks* as *f, e*, whereof one hath a *Cord* Nine *Foot* and an half long, and the other half a *Foot* less. Put the *Knot e*, of the longest *Cord* about the end of the farther *Stick*, and then retiring drive your *Peg f* into the Ground just opposite to the two little *Pegs c, t*, and then coming to the other end past your *Stick a*, into one of the shorter *Cords*, and so drive your *Peg* just with the others in a direct *Line* as *c, t, f*, that your *Cord a, e*, of the *Net* may be throughly strained.

Having thus directed you to set one *Net*, your own Judgment will lead you to do the like with the other; only observe so to place them that when they are drawn, one may clap about half a *Foot* over the other.

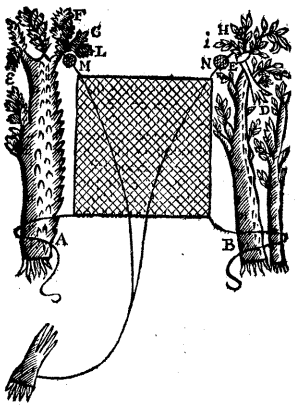
The next thing to be done, take the Grand *Cord* which is to make your *Net* play, and place the longer *Branch a*, about the end of the *Stick a*, and the other *Branch K*, about the *Stick K*; then tie the *Knot b*, so that it may rest in the middle, and cary the end to your *Lodge*; strain it a little, and then fasten it with a *Peg A*, and about *B*, make some kind of Hold-fast for the better straining it, and that it may not slip again through your *Hands*, and just even with the said *Hold-fast* make two *Holes D, E*, in the Ground to thrust against with your *Heels*.

Your *Lodge* must be made of *Boughs* in such manner that you may have a full and clear view on your *Nets* before, and it should be covered over head, nor be very high, that you may have a prospect on all *Birds* coming and going.

The last thing is the placing your *Calls* (for so are the live *Larks* called); you see by the *Figure* in what place you are to set them; set your little *Stick p* in the first place, and let the upper part be about six *Inches* out of the Ground, then place the two others *q, r*, on the right, and the other on the left, just at *m*, of the *Rod*, where the *Cord* of the said *Pegs* is fixed. Then tie the end of one of the *Packthreads* of one of the *Reels* about three or four *Inches* from *m* near the place marked *n*, and then carry your *Reel* to the letter *F*, the like you must do with the other *Rod* tied at the end *o*, and at equal distances tie the *Call-Larks* by the *Feet*, so that when you see any *Birds* near you, 'tis but twitching your *Cords*, and

and you force the *Larks* to mount a little, that thereby those others may take notice of them; when they are within your distance pull your main *Cord* and your *Net* flies up, and claps over them.

They that have observed any great Flight of *Larks* towards *Evening*, may take many of them by the help of a large *Drag-Net*, the description whereof together with its use is treated of in the Eighth *Chapter* under the Head of the *Spread-Net*, or *Drag-Net*; only for *Larks* the *Meshes* must not be above an *Inch* Square, and your *Net* should be large. You need no other directions.



CHAP. XXI.

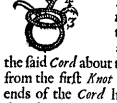
Instructions and Directions touching Cock-Roads for the taking of Wood-Cocks, and to supply the defect of a Tree in a convenient place for a Cock-Road.

Cock-Roads are easily made and being once done cost nothing the preserving, yeilding a considerable Profit as well as Pleasure, when in an *Evening* either by ones self, or his *Servant* (if he be trusty, and that you live near no great *Markets*,) you may perhaps take Three or Four Brace, and as many in the *Morning* of excellent *Wood-Cocks*; and one so taken is worth two that are *Shot*.

The Nature of the *Wood-Cock* is to lie close all day under some *Hedge*, or near the *Roots* of Old *Trees*, picking for *Worms* under dry *Leaves*, nor will he stir unless some accident of noise spring him up, being of a fearful Nature, and doth not see well his Way before him in the *Morning* early: and towards the *Evening* they use to take Wing that they may get to *Water* (for they seldome meet with any but at those times) and then they would hardly stir, did not meer Thirst compel them. When they fly 'tis generally low, to the end they may not be so well discovered, and when they find any Through-fare through any *Wood* or Range of *Trees* they use to venter through. In such places therefore it is that you ought to make your *Cock-Roads*, and plant your *Cock-Nets*, according to the Following *Figure*.

Supposing then that your Range of *Wood* be about Thirty Paces long, then cut a *Walk* through it, near about the middle, about Thirty six, or Forty *Foot* broad, which must be directly streight with all the *Shrubs*, and *Under-Wood* carried away: likewise all the *Boughs* that hang over the said *Walk* must be cut off; then choose out two *Trees* opposite to each other, as it is represented in the said *Figure* marked *A, B*, and prune, or cut off all the *Front Boughs* to make way for the *Net* to hang and play.

The next thing is to provide two strong *Legs* of *Wood*, which open or cleave at the biggest ends, as marked *C, D*, the middle parts tie fast unto some *Boughs* of the *Tree*, as the letters *E, F*, direct, and let the Tops hang over, as *G, H*, represent; you should always have in readiness good store of *Pullies* or *Buckles*, made of *Glass*, *Box*, *Brass*, or the like, according to the Form designed by the *Figure*, which should be about the bigness of a *Mans Finger*, and fasten one at each end of the *Perches*, or *Legs G, H*, having first tied on your *Pullies* about the two *Branches* marked 3, a certain *Cord* of the thickness of ones little *Finger*, and then tie another *Knot* on the said *Cord* about the distance of a *Hands* breadth from the first *Knot* marked 4, and so let the two ends of the *Cord* hang down about a *Foot* long, that therewithal you may fasten them to the *Pullies* which are at the ends of the two *Pearches* or *Legs*, as is marked by *I, L*, close to the Notches *G, H*, then clap into each *Pully* a small *Packthred*, the end of each should reach to the *Foot* of the *Trees*, that by the help of them you may draw up two stronger *Cords* into the said *Pullies* where you hang the *Net*, and not be forced always to climb up into the *Tree*.



These

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These latter you may let hang, always provided you live by honest Neighbours.

The last thing to be provided is a Stand to lie concealed, about half a dozen *Boughs* pitched up together may serve for that purpose, with a strong Crooked *Stake* forced into the Ground just by the *Stand*, whereon fasten the *Lines* of the *Net* when it is drawn up. Remember to tie a *Stone* to the end of each of the two *Cords* of about four or five pound weight apiece, that when you let go, the weight of the *Stones* may force down the *Net* with a strong fall, and pull up both the *Stones*, and the upper part of the *Net* close to the *Pullies I, L*, the *Stones* are marked *M, N*, and the *Figure* represents the whole *Net* ready for use. The ends of both *Lines* must be drawn to your *Lodge* or *Stand*, and wound twice or thrice about the *Crooked Stake* to prevent the falling of the *Net*, until you think fit, that is, until some Game Flyeth against the *Net*. Sometimes it so falls out, that a *Covey* of *Partridges* have been taken by this Invention, and now and then a *Hare*; so that you should be sure to look out diligently against all occasions.

If any *Beast* come *Thwart* you, let them pass under your *Net*, about five or six *Foot*, then make a noise with a shout, and so let go: The *Beast* at the first noise will retire back, and so become ensnared. To be sure if you let go whilst he is just under the *Net*, he will either spring forwards or back-wards, and not be taken, but most likely he will retire back.

It often happens that a *Man* perceives a great Through-fare of *Birds* between some *Coppices* or *Timber-Woods* over a certain piece of Ground, where he wanteth the conveniency of a Good *Tree* to oppose some other, which possibly stands according to his mind; but whether he wants one or two, if he find the place likely, and that in a probability it will quit his cost, let him then take one or two young *Trees* fit for the purpose, and plant them deep in the *Ground*, that they may stand all *Weathers*.

To take WOOD-COCKS by Nets in high Woods by driving them into Nets.

YOur *Net* must be like your *Rabet Hayes*, but not so strong, and about Twenty *Fathom* long; and of these you should have Two or Three.

Being provided with *Nets*, and having the assistance of five or six to go into the *Wood* with you, which should be at the least Seven or Eight Years growth (for the elder the better) then go into some part thereof, about the middle, if it be not to large, and Pitch your *Nets* along as you do for *Rabets* (but one joyning to the other) slopewise, hanging over that way which you design to drive the *Cocks*. You may make room for the *Nets*, if there be no Paths, by splashing away the *Shrub-Wood*. Your *Nets* being thus fixed, let your company go to the end of the *Wood* at about Ten *Rod* asunder; and having *Sticks* in their *Hands*, make a noise, as also use your *Voyces* as if you were driving *Cattle* along, and so go forward and forward till you come to the place where your *Nets* are set, and you will not fayl to catch those that are in that part of the *Wood*.

Then when that part of the *Wood* is thus drove, turn your *Nets* slopewise to the other side, and go to the other end, observing the aforesaid Directions.

This way you may use to take them at any time of the *Day*, with great ease and pleasure.

CHAP. XXII.

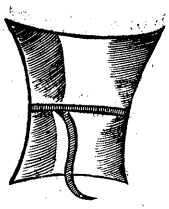
Several Sorts of Strings, Springes. Engines, &c. for the taking of Fowls and Birds, either on Hedges, Trees, or on the Ground.

THere are several Devices for the taking of *Fowl*, and *Birds*, both great and small; and that either those peculiar to the *Water* or *Land*, or for both; and that on *Hedges*, *Boughs*, *Trees*, or on the *Ground*. The first way I shall represent is to take *Fowl* with *Strings* or *Lines*.

Let the *Strings* or *Lines* be made of long small *Cord*, knotted here and there, and conteyning in length as many *Fathoms*, as the places, or *Haunts* where you are to lay them require. These are of great use for the taking of all sorts of large *Wild-Fowl*, as also for the *Plovers* of both kinds.

When you shall use these *Strings*, they must be well *Limed* with the strongest *Bird-Lime*; then coming to their *Haunts*, if it be for the *Evening Flight*, then before *Sun-Set*; if for the *Morning Flight*, then at least two Hours before *Day*; and having a burthen of small *Sticks* about two *Foot* long, sharpned at the lower end, and with a little *Fork* at the upper end, let them be pricked into the Ground in even *Rows*, all over the place of their *Haunt*, one *Row* distant from another about a *Yard* or two, and one *Stick* siding another within Four or Five *Yards* as they may conveniently bear up the *String*; and let them be prick't a little flauntwise, so as they may be within a *Foot* and an half of the *Ground*. Then shall these *limed Strings* be drawn and laid upon the *Forks* some *Rows* higher than others, and higher in one place than in another, like the Waves of the *Water*, till every *Row* be filled, and the *Haunt* covered all over. Then fasten the ends with a *Sliping Loop* in such wise, that upon any Violent strain the whole *String* may loosen, and lap about any thing that toucheth it, and by this Invention great store of *Fowl*, especially *Plovers*, may be taken by reason of the great *Flocks* they come in; and they are commonly taken at their coming to the *Ground*; whose Nature is to swoop close to the *Ground* for a pretty distance before they light, and so falling amongst the *Strings*, are taken. You need not be constantly at Watch: for being entangled they can't loosen themselves. When you have done your sport lay them up for another time, only new daubing them with fresh *Bird-Lime*.

You may make use of these *Strings* or *Lines* for the taking *Water-Fowl*, and then use the best and strongest *Water Bird Lime*, such as before shewed you. These *Strings* must be laid over the *Rivers*, *Ponds*, or *Plashes* of *Water* where you design to take any, which must be in such places where their *Haunts* are, and let the said *Strings* almost touch the *Water*, and as thick laid as before noted for *Land Fowl*. And be sure to take this Caution, not to use these *Strings* in *Moonshine-nights*; For the Shadow of the *Lines* will create a jealousy in the *Fowl* and so frustrate your Sport.



Of the great and lesser Springes.

SPringes are thus made, and thus to be accommodated; First, well knowing the *Fowls Haunts*, and the places where the Flocks or Couples of great *Fowl* do usually feed in the Mornings or Evenings, and observing well the *Furrows* and *Water-Tracts*, where they usually stalk and paddle for *Worms*, *Flot-Grass*, *Roots*, and such like things on which they feed; and be sure to observe where several *Furrows* or *Water-Drains* meet into one, and after a small course divide themselves again into other Parts or Branches; this middle part being the deepest, and as it were feeding the rest; and also observe which is most padled, and fittest for them to wade in, and such are the most likelyest places for your purpose. Then take small and short *Sticks*, and prick them cross-wise overthwart all the other *Passages*, one *Stick* within about half an *Inch* of each other making as it were a kind of Fence to guard every way but one, which you would have the *Fowl* to pass.

All *Ways* except one being thus hemmed out, take a good stiff *Stick* cut flat on one side, and pricking both Ends into the *Water*, make the Upper part of the Flat-side of the *Stick* to touch the *Water*, and no more; Then make a *Bow* of small *Hazel* or *Willow* in the fashion of a *Pear*, broad and round at one end, and narrow at the other, and at least a *foot* long, and five or six *Inches* wide, and at the narrow End a little small *Nick* or *Dent*; then take a good stiff young grown Plant of *Hazel*, *Elm*, or *Withew*, being Rushy grown, and clean without *Knots*, three or four *Inches* about at the Bottom, and about an *Inch* at the Top; and having made the Bottom-end sharp, fasten at the Top a very strong *Loop* of about an hundred *Horse-hairs*, plaited very fast together with strong *Packthread*, and made so smooth and pliable to slip and run at pleasure; and this *Loop* shall be of the just quantity of the *Hoop* made Pear-wise, as before mentioned; Then hard by this *Loop* with strong *Horse-hair*, within an *Inch* and an half of the end of the *Plant* fasten a little broad but thin *Tricker*, made sharp and equal at both Ends after this proportion. And then the bigger sharp End of the *Plant* being thrust and fixed into the Ground close by the Edge of the *Water*, the smallest End with the *Loop* and the *Tricker* shall be brought down to the first *Bridge*, and then the *Hoop* made *Pear*-wise being laid on the *Bridge*, one End of the *Tricker* shall be set upon the Nick of the *Hoop*, and the other end against a Nick made on the small End of the *Plate*, which by the violence and bend of the *Plant* shall make them stick and hold together until the *Hoop* be moved: This done, the *Loop* shall be laid upon the *Hoop* in such fashion as the *Hoop* is proportioned; then from each side of the *Hoop* prick little *Sticks*, as aforesaid, as it were making an impaled *Pathway* to the *Hoop*; and as you go farther and farther from the *Hoop* or *Spring*, so shall you widen the Way, that the *Fowl* may be entred a good way in before they perceive the *Fence*. The first Entrance being about the wideness of an indifferent *Furrow*, so that any *Fowl* falling, they may be enticed to go and wade upon the same, where they shall no sooner touch the *Spring* with their *Head*, *Foot*, or *Feathers*, but they shall be taken; and according to the strength of the *Plant* you may take any *Fowl* both great or small.

To take small Fowl with the Engine.

FOr the taking smaller *Fowl* with this *Engine*, as the *Snipe*, *Woodcock*, *Pewit*, or the like, that useth to feed in *Wet* and *Marshy Grounds*, and amongst *Water-furrows* or *Rillings*, from thence sucking the Fatness of the *Soil*, the *Device* and *Engine* is the same without alteration; only it may be of much less strength and substance, according to the *Fowl* it is set for, especially the *Sweeper* or *Main Plant*; which as before is prescribed to be of *Hazel*, *Elm*, or *Withew*; or so in this case may be of *Willow*, *Sallow*, or strong grown *Oster*, or any yielding *Plant* that will *bend*, and come again to its own straitness. And this kind of *Engine* is only for the *Winter Season*, when much *Wet* is on the Ground: But if there happen any great *Frosts*, so that you are deprived of the *Waters*, then search out where these standing *Waters* have any descents or small Passages, so as by the swift Current the *Water* is not frozen, and there set your *Springes*, and the greater the *Frost* is, the apter are they to be taken.

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Directions for making the Bramble-Net, *Termed by some the* Hallier.

THe Form of this *Net* is Represented in one or more of the foregoing *Prints*. Those that are for *Pheasants* are larger than those for *Partridges*; and those for *Partridges* larger than those for *Quails*, *Coots*, and the like. The manner of making them is one and the same. Your great *Meshes* must be four Square, those of the least size are three or four Inches Square, and those of the biggest are five; in Depth they should not have above three or four *Meshes*; as for the length you may enlarge them as you think fit, but the shortest are usually eighteen Foot.

If you intend to have your *Net* of four *Meshes* deep, make it of eight, for as much as it is to be doubled over with another *Net*, likewise between the said *Doublings*; the Inward *Net* must be of five Threads neatly Twisted, with the *Meshes* two Inches Square made Lozengewise, with a neat *Cord* drawn through all the upper *Meshes*, and another through the lower, by which you may fasten it to the double *Hallier*.

In the last place fasten your *Net* unto certain small *Sticks*, about one Foot and a half, or two Foot long, and about the same distance from each other. Your inward *Net* must be both longer and deeper than the outward, that it may hang loose the better to Entangle the *Game*.

For *Pheasants*, both the one and the other should be made of strong double Twisted *Thread*, and for *Partridges*, *Quails*, and the like, of *Silk*.

CHAP. XXVI.

How to take Blackbirds; Feldivars, *and the like* Birds *in Misty Weather in Highways, and by the sides of Hedges.*

IN *Misty Weather*, *Blackbirds*, *Thrushes*, *Feldivars*, and such like *Birds* do generally fly by the sides of *Hedges*, making no long Flights. For the taking them in the midst of their Flight do thus. Observe the Figure in Chapter XXV. and accordingly prepare your *Net* about six Foot deep, and twenty Foot long, it is called the *Cobweb-Net*. Then get a *Staff* about six or seven Foot long, which must be a little flit at the small end *D*, and sharpned at the other end *F*, with which go along by the *Hedge side*, where you suppose there is *Game*; and having found some, pitch your *Net* about twenty or thirty Paces from the place where they went in according to this direction. If there be any *Tree* about twelve or fifteen Foot from the *Hedge* side, or if it be in a way where there are two *Hedges* not above fifteen or twenty Foot asunder, then you need not make use of your *Staff*, otherwise you must.

Suppose it were in a *Highway* with *Hedges* on each side as *E*, *I*, for Example, then choose out some *Bough* about six or seven Foot high, which hangeth in towards the way as the Letter *B*; make a small cleft in it at *A*, and gently thrust thereinto the small wooden *Wedge*, which is tyed at the *Packthread*, runing through the upper part of your *Net*; and then do the very same on the other side of the way, as *F*, *I*, so that your *Net* may hang as it were bent. Then fetch a Compass about at least thirty Paces beyond the place where you saw the *Birds* fly in; and when you come near, they will fly back by the *Hedge* side, and so come against your *Net*, which being slightly hung, will fall upon them, and so they are taken.

In case there be but one *Hedge*, and no opposite *Tree*, then make use of your *Stick*.

CHAP. XXVII.

Divers necessary Observations touching the Natures and Dispositions of Plovers, *and other wild Fowl, with Directions to take them.*

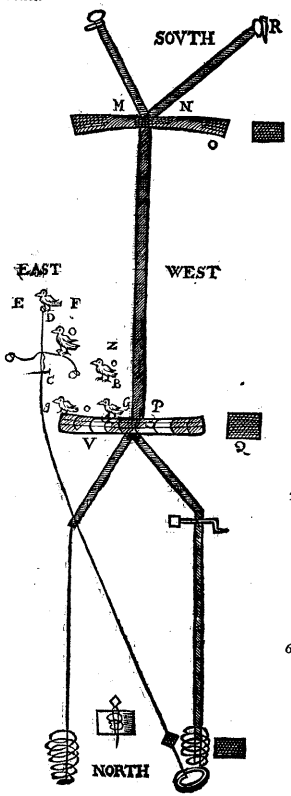
I shall begin with an Apology for the length and Curiosity of this *Chapter*, to the end, Industrious and Active Spirits may furnish others with fresh and Beneficial Advantages of the same kind.

Plovers use to fly in exceeding great Flocks together, they generally come to us about *September*, and leave us in or about *March*; In *Frost* and *cold Weather* they seek their Food on such *Lands* as lye near and adjoyning to the *Sea*. In *Thaws* and open *Seasons* they go higher into the *Countrey*, so that their whole labour is to rise and fall, as we say. They delight much to feed in *Ploughed Lands*, especially if Sowed; and having fed they presently seek out for *Water* to wash their *Beaks* and *Feet*. When they sleep they do not *Pearch* on any thing, but Couch or sit on the *Ground* as *Ducks* or *Geese*; they only sleep in Calm Weather, otherwise they pass most part of the *Night* in runing up and down to seek for *Worms*, as they come out of the *Ground*; and then they always make a little cry purposely to keep close together, for at day break they all unite into one Body, and so depart; if in their *Flight* they chance to espy any others on the *Ground*, they usually call them to them, and if they refuse to go, they make a stay expecting some Booty. There are many other *Fowl* that accompany with them, as *Lapwings*, *Teal*, and the like.

They are most easy to be taken when not intermixed with other *Fowl*. Especially in *October*, soon after their first coming, as being unacquainted with the Instruments of their Ruine; also in *March*, they are easily taken, for then they begin to Couple. It is not good to set your *Nets* for them in long *Frosts*, and continued cold *Seasons*, but intermixed with *Weathers*; of all *Winds* the North-west is the worst to take them; and as you ought not to set your *Nets* in some *Winds*, so ought you exactly to place your *Net* according to the *Wind*, as hereafter shall be directed.

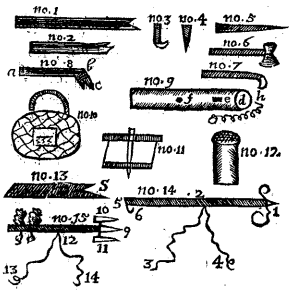
All *Sea Fowl* fly against the *Wind*, when ever they design to rest on the *Land*, therefore observe to fix your *Nets* according, to play with the *Wind*.

This following *Figure* doth represent the manner how to set your *Nets* when the *Wind* is Easterly, that they may play Westerly, that so the *Birds* may be taken flying cross the *Net*, not longways with it; nor are you tyed exactly to observe the Situation of the *Wind*, in regard sometimes the place where you intend to pitch will not bear it, but the nearer you come to it, so much the better.



Several necessary Instruments to be used in taking Plovers.

THere are many little necessary things to be used in taking *Plovers*; I have therefore represented the Forms of them in a *Figure* altogether, as followeth.



In the first place you must be provided with a *Net* or two, which are called *Leap-Nets*, the *Meshes* are *Lozengwise* and about two *Inches* Square. The *Net* should be about two *Fathom* long, and eighty *Meshes* deep; I shall not trouble you with the way of making it, although it be of great use in *Fowling*, it being an *Art* it self, and to be bought at the *Shops* that sell *Nets*. Secondly, you must have two *Staves* marked 1, 2, about the bigness of a *Mans Arm*, the one about nine Foot long, and the other about ten, and they must be a little Notched in at the smaller ends. Thirdly, you must have two pieces of some *Pipestave*, as marked 3, a *Foot* long, and three *Inches* broad, pointed at one end. Fourthly, you must have a couple of *Staves* about the bigness of ones *Thumb*, ten or twelve *Inches* long, and pointed at one end, as that marked *No.* 4. Fifthly, get three other pieces of *Wood No.* 5. each two Foot long, and about the bigness of a *Pitchfork*, sharpned at one end. Sixthly, you must be provided with a small *Hatchet*, marked *No.* 6, the sharp side not above three *Inches* deep, with a strong Head to bear in the *Staves*. Seventhly, you must have a good *Knife*, as marked *No.* 7. Eighthly a *Stick* in the Fashion of a *Billiard Stick*, as *No.* 8. represents, which must be two *Foot* long from *a* to *b*, ending in a point at *a*, the other end *b*, *c*, must be a *Foot* long bending; and it must be cut in three Angles at the Letter *c*. Ninthly, have a *Pipe* or *Whittle* to call the *Plovers*, as *No.* 9. represents; it may be made of the Thigh *Bone* of a *Goat*, or a large *Sheep*, and cut off at both ends about three *Inches* long, at the end *b* fill it with *Wax* into the opening *e*, then make the *hole d* plain under the *Bone*, that the Wind may come in; Then make a Hole at the middle *f*, just above big enough to receive a small *Goosquil*, and another

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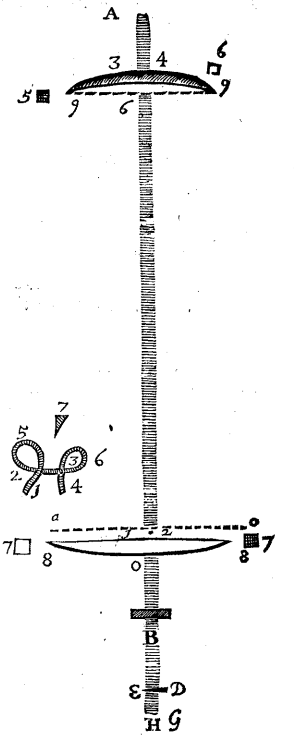
ther a pretty deal bigger, to give it the clearer Sound; and likewise that you may thereby hang it about your *Neck*, pierce a small Hole at *b*, to receive a *Packthread*. Tenthly, have a small *Pannier*, or *Basket* as *No.* 10. big enough to hold three or four live *Lapwings*, with a Hole at the top to put them in. In the Eleventh place have three or four *Reels*, such as *Gardiners* use to Line out *Borders* and *Walks*, for the Winding up your *Lines*, as is Represented in the eleventh *Figure*. Twelfthly, have a Commodious *Sack* or *Wallet* to carry your things according to *No.* 12. Thirteenthly have another sort of *Pipe*, represented by *No.* 13. being nothing but a piece of *Wood*, lesser than ones little *Finger*, and three *Inches* long, cleft at the end *s*, unto the middle *T*, wherein fix a *Bay Leaf* to imitate the Cry of *Lapwings*. Fourteenthly have two *Rods* according to *No.* 14, each two *Foot* and a half long, and strait, light and slender, at the bigger end 5, you must fasten a *Peg* as marked 6, three or four *Inches* long, and pretty close to the Rod; at the middle 2 that is nearer the great end, tye a couple of *Packthreads* each two Foot long, with a *Peg* at each end, as 3 and 4, of the same size with the former *No.*6. At the small end of the *Rod i*, fasten a slender *Packthread*, with a Double at the end to clap about the Body of a *Lapwing*; and the other end which is single must be a good deal longer, to fasten the Tail of the *Bird*. And in the last place have a *Holm Stick*, according to *No.* 15. about four or five *Foot* long, indifferent strong, at the great end fasten two *Pegs* at each side, one as 10 and 11, about the bigness of ones little *Finger*, and six *Inches* long: about a *Foot* and a half from thence fasten two *Packthreads*, each two *Foot* and a half long, with a *Peg* at each end, about the same size with the former, marked 13 and 14. These are the main Implements to be used; now follows to apply them to use.



Instructions how, when and where to pitch your Nets for the taking of Plovers, and the like.

THe best place to pitch for *Plovers* and such like *Fowl*, is in large common *Fields* of *Green Corn*, where there are neither *Trees* nor *Hedges*, at least within three or four hundred Feet of the place where you design to work. If there be any Water in the place, endeavour to pitch nearer, for *Plovers* delight therein to cleanse their *Beaks* and *Feet* after they have dirted them with turning the *Earth* up and down for *Seed* or *Worms*. You must be careful that the Plot where you pitch, be a little lower than your *Hedge*, or at most equal with it, for higher it must not be. This following *Figure* sheweth the manner of contriving your Plot of Ground.

Suppose the place where you design to pitch, reach from *A* to *B*, and the distance between the *Platform*, and your *Lodge* from *B* to *E*; and that the Wind blow South, you must have a *Packthread* about fourteen or fifteen *Foot* long, and fasten it to a couple of *Pegs A*, *B*, which fasten in the Ground to line out the place for your *Nets*. Then take the *Billiard Stick No.* 8. in the foregoing *Figure*, and beat the Earth with the Triangular end, as if you would cut, and so pass along that whole length of the *Packthread*, which is about twelve or fourteen Fathom, the exact length of your *Net*: And when your *Border* is made, then take away the *Packthread*, and take the shorter of the two *Sticks No.* 1, and place it at the bottom of the border at *No.* 1, and the bigger end of the said *Stick* must be at *No.* 8, not directly strait, but bending at least two *Foot* inwards, just as you see it drawn before you in the *Figure*. Then

Then hold it fast with one Hand, and with one *Finger* of the other, or with the handle of your *Knife* Trace out the Form of its Position, that it may rest Imprinted in the Earth; then with your great *Knife No.* 7. cut along your Trace or Border of your said *Stick*, and with your *Hatchet No.* 6, cut out the Earth between the two *Traces* or *Lines a*, 1, 8, 0, begining at the End *j*, and finishing at 8 in such manner, that at the End *j* the *Earth* may be taken out but one *Inch* over, and at the End 8 four or five *Inches* large, that your *Stick* may be hid as it were in the said *Gutter*.

This being finished, carry the other *Stick No.* 1. (being the longer of the two) unto the other End of your long *Border*, and plant it in the self same fashion; then take your little *Stick No.* 3. which drive into the Ground at the end of your two *Gutters*, as 8 and 9, to hinder the two main *Sticks* from beating into the Ground with the force of the *Net*. Your two *Sticks No.* 4. also drive into the Ground about half a *foot* from your *Border* at 1 and 3, a little inclining Inwards; the intent being to prevent your main *Sticks* from returning back when the *Net* is strained until the *Cord* be pulled: besides, should you place them Outwards upon the *Lines* 9, 6 and 8, 0, it were impossible to make your *Net* play; for then the more you strain the *Cord*, the closer would your main *Sticks* come under your *Sticks No.* 4. then remove all the loose *Earth*, except an Handful or two, which lay on the two Ends 5 and 7, the better to raise up the other Ends of the main *Sticks*, and then your *Platform* is ready fixed.

Now in case you make two other *Gutters*, as 2, 8 and 4, 9. on the other side of the *Border*, opposite to your two first, then your *Platform* will serve for two contrary *Winds*, viz. *North* and *South*. I shall direct you how to dispose of the remainder of your *Newsits*, in turning back to the first *Figure* in this *Chapter*.

If you intend to take any *Plovers*, be on the place where your *Platform* is ready made with all your *Implements* early in the *Morning*; then place the main *Sticks* in the little *Gutters*, and take your *Net* on your left *Shoulder*, or *Arm*, and go towards the *Lodge*, which is about fifteen or sixteen *fathom* from your *Platform*, and there place the *Buckle* which is at the End of the *Cord* of your *Net*, and so go backwards towards your *Platform*, letting the *Cord* trayl all along, and being at the *Stake* or strong *Peg S*, fasten thereto the *Cord* of the *Pully T*, so that the *Pully* be in a direct line with the two Pieces of *Wood Q*, *o*; then when you come to the *form* let your *Net* it self fall by degrees, and still retiring backwards. When you are at the *Peg* behind, which is *R*, strain the *Cord* until it be right and strait, and then fix it to the said *Peg* that it may not slip back.

I have also for the conveniency represented to you, with what menner of Knot it is that you should fasten your *Cords* on this occasion. Supposing that the *Peg* 7, be the Piece whereunto you pretend to fasten your *Cord* 2, 4, take it in one of your *Hands* at 1, and being over the *Thread* 2, to form the *Buckle* or *Knot* 5; which pass over the *Peg* 7; then make another *Bow* or *Buckle*, as 6, wherein the *Thread* 4 is passed under, and to clap this *Bow* over your *Peg* upon the Top of the other *Bow*; then strain the two ends 2 and 4, and your Knot will be compleat, and you must be very exact and ready at it.

When the End of the *Cord* of the *Net* is thus fastned, lift up your man Stick *P*, *Q*, and place the great End in the *Gutter Q*, drawing the *Cord* of your *Net* towards your *Border*, and force it into the Notch in the small end of your main *Stick*, and let some Body hold it there; But in case you have no help, lodge it in your *Gutter* under the *Peg P*, and drive the sharp End of the *Billiard* into the Ground upon it, to stay there until you go to the other main *Stick N*, *o*, and there fix your *Cord* into the Notch at the End *M*. It must be so straitned, that a great deal of strength may be used to get it into the Notch; then place your main *Stick* in the *Gutter* under the *Peg N*. Remove your *Billiard* from your main Stick *V*, *Q*, and force your *Net* into the *Platform*, so that it be hid under the *Cord*.

The next thing to direct you in is the placing your *Call-Plovers* and *Artificial Lapwings*, which must be disposed as you see the *Cyphers* 00000. In case the *Wind* be not directly *East*, but inclined a little towards the *South*; then your first *Pelt*, or counterfeit *Bird* (which is nothing but the *Skin* of a *Bird* stuft with *Chaff*, or the like) marked 3, shall be placed half a *foot* from your *Border*, and about eight or nine *foot* from the End *V*, the rest you may range in such order as they are designed by the *Figure*, at about two *foot* distant from each other; whereas in case the *Wind* be North-East, place your *Birds* a good deal farther from the End *V*, that is to say, about six *foot* further; because *Wild-fowl* always fly against the *Wind*, and then as they pass over the *Stakes*, or *Artificial Birds*, that is betwixt them and the hinder *Stake R*, it may so fall out that they may pass under the *Cord*; for that will be shorter by a third part when it is let loose, and by a moity, if the *Wind* be strong, which you must diligently observe when there is but little *Wind* stirring. You may place two thirds of the *Birds* behind your *Net*, and if it be strong, one third part is enough, the rest should be before, because *Plovers* will come where your *Birds* are.

As for *Lapwings*, they must not be mixed with your *Plovers*, but placed just by your *Gutters*, as the Letters *g*, *g* import.

The next thing you are to dispose is your *Live Birds*; if you intend to use two, drive them one before, and the other behind; if you have only one, place it behind in this manner: Force your little piked *Staff C* into the Ground, which is tyed to the bigger End of the *Rod*, and then hold up the little End *F*, to see if it stand right with the *Lodge*, and if so; hold it a *foot* high whilst you stick the two *Pegs A*, *B*, into the *Earth*; then tye a *live Lapwing* unto it with the *Packthread* about its *Legs*, which *Packthread* should be indifferent long, to the end the *Lapwing* may not hurt it self; then put the Tail

about

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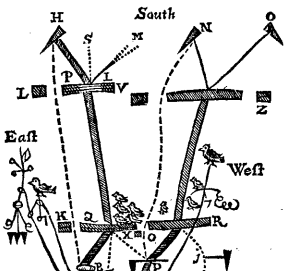
about the End of the *Rod*, and faſten it with another *Packthread*, and ſo taking one of the *Reels*, faſten the End of the *Thread* which is above the quarter part of the length of your *Rod*, to the place marked *E*; and the *Reel* to the *Lodge*. If you plant a couple of *Lapwings*, you muſt place the other in the ſame manner before your *Platform*.

Your *Holm-ſtick* muſt be placed about three or four *fathom* from the *Border*, and about ſix *foot* beneath the laſt *Pelts* or *Artificial Birds*. To ſet it right in order do thus: Drive into the Ground the two *Pegs* marked at the great End *M*, in ſuch manner as your *Holm-ſtick* may move like the *Axeltree* of a *Cart* between the two *Wheels*; take the little End *X*, and lift your *Rod* almoſt ſtrait up, that it may be right with the *Lodge*, and then faſten your two *Pegs H, j* in the Ground: Then faſten the End of your *Line* to one of your *Reels* at the middle *L* of your *Rod*, and carry the other end to your *Lodge*. The *Holm-ſtick* muſt be tyed at the End *X* of the *Rod*; your *Holm-ſtick* muſt be laid down cloſe, and covered with ſome *Boughs*, *Straw*, or the like, that the *Birds* may not be affrighted at the ſight thereof.

This *Holm-ſtick* is nothing but the two *Wings* of a *Kite* or *Buzzard*, which are tyed with two or three *Hawks-bells* at the End of the *Rod* for the purpoſe that ſhall be anon declared.

Directions for preparing the Lodge, for thoſe that take Plovers *and the like Wild-fowl.*

THe *Lodge* is to be thus made: Take five or ſix *Boughs* about three *foot* high, and ſtick them in the *Ground* like an *Hedge*; it muſt be open at the Top, that you may hear and ſee the *Birds* that paſs near you.



The *Figures* 1, 2, 3, 4, 5, 6, 7, 8, 9 repreſent it unto you, as alſo how you may (being a ſingle *Perſon*) manage two *Nets* at the ſame time from one and the ſame *Lodge*. Your *Seat* muſt be of ſome *Turf* about a *foot* ſquare, and three or four *Inches* thick, which put beneath the *Cord* at the place marked *C*, where your *Cords* croſs each other, and where one may touch the Hold-faſts *f, g*, to ſtrain the *Nets*. You muſt lay a good handful of *Straw* under the *Cord* upon the *Turf*, to prevent dirting the *Cord*, as well as ſpoiling the *Turf*; and you had need to have a good Armful in your *Lodge*, to keep you warm and dry as occaſion requires. You muſt likewiſe cut two little Holes in the *Ground* to reſt your *feet* when you ſtrain your *Cords*, the Letters *D, E* denote the place where. The ſame things muſt be all obſerved, if you uſe but one *Net*. But he that will undertake to manage two *Nets*, had need to ſee firſt the manner of it, at leaſt to obſerve theſe following Directions.

You have been already fully inſtructed how to plant one ſingle *Net*, which being done, Take a long *Cord*, repreſented by the pricked *Line K, j*, which at one End faſten to the *Peg M*, about two or three *foot* from the ſide of the *Peg T*; the other End faſten to the *Peg H*, ſo that the part *K* of the *Packthread* may be diſtant between five or ſix *fathom* from the End of the *Gutter O*. When the ſhorter of your two main *Sticks* is fixed, one End at *K*, and the other at *Q*, carry the bigger of them ten or twelve *fathom* diſtant; one End being ſet at *j* within half a *foot* of the *Packthread*, and the other towards *L*. Let them be ſtooped down, and then fix another *Packthread*, repreſented by the pointed Line *S, T*, which muſt be ſtrained hard: Then with your *Billiard-ſtick* make your *Border* or *Platform Q, P*; then cut out your *Gutters*, and place your *Pegs* and *Sticks* as they are placed in the beginning of this *Chapter*, numbred 3 and 4, and placed in the former *Net*.

You may make this Form ſerve for two *Winds*, if you make the *Gutters V, X, Z, R*, juſt oppoſite to the others; and then place your main *Sticks* in them, turning about your *Cords*; and tranſplant your *Lodge*: As for Example, The foregoing *Figure* repreſents two *Nets*, which are ſet for a Weſterly-Wind; Suppoſe the *Wind* ſhould chop about and turn Eaſternly, you muſt then firſt of all put the End of the *Cord M* to the *Letter B*, the ſtrong Peg *A* to the little *p*, and the *Stake* behind *H* to the little *m*; the main *Stick K* to the Letter *X*, the other *j* to the Letter *V*, and your *Net* will be then ſet for the *Eaſt-wind*. You may likewiſe tranſpoſe the other *Net* by turning the *Cord T* to the little *a*, and the ſtrong *Peg* to the little *o*, and that *Stake* behind to the Letter *N*.

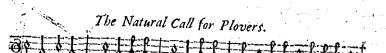
You muſt alſo turn about your main *Stakes*, and make a low Seat at the Letter *b*, and dreſs up your *Lodge* there; the two pointed Lines *a, b, j, n*, and *b, h, p, m*, do fully demonſtrate how the *Nets* ſhould be placed when the *Wind* is turning about. Your *Birds* both dead and alive muſt alſo be altered as you there ſee; and you muſt ſet two or three counterfeit *Birds* before the firſt *Border* with a *Lapwing* or *Call-Bird*, and

and another behind the *Platform*, the reſt of the *Artificial Birds* may be ſet before the *Border P, Q*, and the *Holm Rod* behind the laſt *Net*.

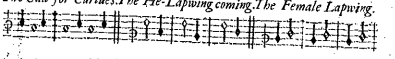
Inſtructions when and how to Call, alſo when and how to draw the Net for taking Plovers, *&c.*

YOur *Implements* being all diſpoſed as before directed, betake your ſelf to your *Lodge*, having your *Pipe* hanging at your *Neck*, and when you eſpy any *Game* on the Wing, give them a *Call*, and make your *Call Birds* fly a turn or two over and anon, as occaſion requires; for the *Game* perceiving the *Lapwings* to ſtir and fly from place to place, and your other *Birds* to ſtand feeding as it were, will be decoyed thither in expectation of ſome *Food*. When they come near, be ſure do not make your *Birds* to ſtir at all, for they would then ſoon perceive by the forecaſt of the Motion, that they were tyed; and for fear of being ſurprized themſelves, they will fly away. Neither muſt you with your *Pipe* give them ſuch loud *Calls*, as if at a remote diſtance; but leſſen your *Notes* by *Degrees*. I have thought fit to ſet down the ſaid *Notes*.

The Natural Call for Plovers.



The Call for Curlues. The He-Lapwing coming. The Female Lapwing.



It is very difficult to imitate exactly the *Notes*, without good Obſervation and Practice, but as near as you can *Call* in the ſame *Notes* as you hear them as they paſs by you; and be ſure not to let fly your *Net*, though there were never ſo many of them, and that they were juſt at the *Net*, unleſs they come flying againſt the *Wind*. When you perceive they begin to deſcend, and that they come within eighteen or twenty *Foot* of the *Platform*, let go your *Pipe*, and lay both hands on your *Cord*, to let fly with all the force you can, by giving it a ſmart pull towards you, juſt as you perceive the firſt of the Flock between the two *Stakes, K, I*. If they are about eight *Foot* high from the *Ground*, let them paſs on, for they will wheel about and take another turn; nay ſometimes they will paſs by you eight or nine times before you will find them right for your purpoſe. You will find that moſt an end they will pitch a good way from your *Net*; if you perceive them ſo inclined, make ſome little noiſe to prevent them, if however they take Ground, then get your Aſſiſtant to ſteal out at the back-ſide of your *Lodge*, and fetch a great compaſs behind the *Plovers*, and if you had for that purpoſe your *Artificial Stalking Horſe* or *Cow*, it would be of great uſe. But for want thereof, let him go on all four, or at leaſt ſtooping with his *Head* down, by which means he may by degrees drive them from ſide to ſide, within ten or twelve *Foot* of the *Border*, at which time let him throw up his *Hat*, and give a great *Shout*; upon which they will take *Wing* to fly over your *Nets*, at which Inſtance of time draw in your *Cords* very *briskly*, and take up all thoſe that are under the *Nets*.

When all are gathered up, clear the place of all the looſe *Feathers* that lye on the Ground, and then ſet your *Net* in its former State to take others.

When you have two *Nets* Planted, and that a Flock come, do not preſently draw, but let your Aſſiſtant fetch a compaſs and raiſe them, by which means you may be aſſured of them.

When you ſee a great Flock coming, your Aſſiſtant muſt hold the *Cord* of your *Holm-Rod*, that is, the *Kites* Wings; and draw it juſt when you direct him, that is to ſay, when the firſt *Birds* of the *Flock* fly low, and are within about ſix *Foot* of the *Form*; for as ſoon as ever they perceive the *Holm-Rod* aloft, the laſt of the *Flock* will firſt paſs on, and all of them come within a *Foot* of the Ground, ſo that you may take the greateſt part of them, were they ten or fifteen *Dozen*. You muſt be ſure not to ſtir the *Holm-Rod*, until the *Birds* be within ſeven or eight *Foot* of the Ground, leſt they paſs over the whole *Form* before they ſtoop to the *Ground*. And this is all I ſhall ſay as to this particular way of taking *Plovers*, which though difficult to obſerve, yet if expert in, is very profitable.

CHAP. XXVIII.

How to take Wild-Ducks *with Nets, Hooks, Sliping knots and the like.*

THey that would employ themſelves in taking *Ducks* and *Mallards* with *Nets*, *&c.* ſhould always have ſome wild ones reclaimed, and made tame for that purpoſe; for the wild will never accompany themſelves with thoſe of the real tame Breed. Therefore be provided with at leaſt a dozen of them, for fear of wanting any upon occaſion, for they are often loſt, and much ſubject to miſcarry.

Never place your *Nets* but where you have at leaſt a *Foot* of *Water*, nor much more, ſo that *Marſhes*, *Sands*, *Flats*, overflown *Meadows* and the like, are proper for this Sport.

The *Nets* to uſe are the ſame with thoſe uſed for *Plovers*, and plant them after the ſame manner,

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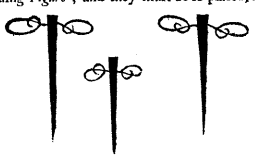
ner, only these are set under *Water*, and you need no *Border* to conceal your *Net*; your Main *Sticks* should be of *Iron*, strong in proportion to their length; but if of *Wood*, fasten good heavy pieces of *Lead* all along your *Net*, at about a *Foot* distance on the sides of it, to sink it down into the *Water*, that the *Ducks* may not escape by Diving; and your *Lodge* should be so contrived as before directed for the *Plovers*. When all is ready, place *Ducks* (that is, the ones) in this manner; tye two or three of them before your *Net*, and as many behind by the *Legs*, but so as they may swim up and down, eating such *Grain*, or *Chipings* as you shall throw to them for that purpose; The *Drakes* keep by you in your *Lodge*; When you perceive a *Flock* coming near you, let fly one of your *Decoy Ducks*, which will presently joyn with the Wild ones in expectation of his *Mate*, and not finding her there, he will begin to call; and the *Female* that is tyed by the *Legs* hearing her *Mate* to call, will begin to cry out, and provoke the others to do the same, upon which the *Drake* comes to his *Female*, and generally draws with him the whole *Flock*, which greedily fall to eat the *Bait* laid for that purpose. The *Ducks* being once come within your Draught, pull your *Cords* with the quickest force you can; and having thus taken them, let go your *Decoy Ducks*, and feed them well, and the Wild ones you may kill; and so set your *Nets* again as you see occasion.

Sometimes the *Wind* is so contrary, that the *Male Duck* can't hear his *Mate* when she cryeth; in that case let go a second, and a third to bring in the company you design to surprize. Your *Decoy Ducks* should have some mark of distinction for your more ready knowing them from the Wild ones, as something sowed about one of their *Legs*.

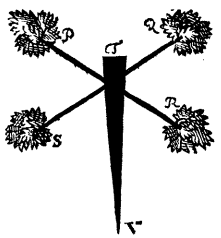
To take Ducks with Runing Slips, and Collers of Horse-hair.

I shall now shew you a cheap, and easy way to take *Ducks* with *Runing-Slips*, &c. especially in such *low Marshes*, as are overflown not above a *Foot* and a half deep.

Observe the *Haunts* most frequented by them, and there cast a little *Grain* for two or three days, to embolden and draw them on, for having once fed there, they will not fail to return thither every Day. You must then plant seven or eight dozen of your runing *Bows* of *Horse-hair* tyed by two or three together unto little sharp *Stakes*, which must be fixed into the Ground according to this ensuing *Figure*; and they must be so placed, that the upper end of the *Sticks* and the *Collers* may be just hid a little under *Water*, and then throw some *Barly* or the like *Grain* amongst your *Traps*, that so you may take them either by their *Heads*, or swiming by their *Legs*.



You must resort thither thrice every *Day*, to see how you succeed, and to order your business as you see occasion.



This *Figure* offereth you a Device much of the same Nature with the former; It is a *Stake* which for length is according to the depth of the *Water* as *T*, *V*, at the great end *T*, bore it with two cross Holes, and put into the said Holes two *Sticks*, one *P*, *R*, the other *Q*, *S*, each about the bigness of ones little *Finger*, and about two *Foot* long; they must be strong set in, and well peg'd, at each end of the *Sticks* fasten your *Collers* or *Slipping Bows* of *Horse-hair* well twisted, as the Letters *P*, *Q*, *R*, *S*, then place your *Stick T*, *V*, that it may be all under *Water*; and so as your *knots* may just swim open on the top of the *Water*, and then cast your *Grain* or *Chippings* of *Bread* in and out amongst the said *Stakes*, the better to entice the *Ducks* to come.

To take Ducks with Hooks, and Lines.

Those that use the *Water* much, and observe where *Ducks* resort, do frequently use to take store of them by *Hooks* and *Lines*, the manner is as here described by these *Figures*.

Fasten your *Lines* well and strong unto piked *Sticks*, as the *Figure* marked *G* represents; and stake down your *Sticks* into the Ground, then Bait your *Hook* with an *Acorn*, *Bean*, or the like, as the *Figures B*, *E*, represents, or with a *Fish* as the *Figure C*. You may also bait it with a *Worm*. By these you may learn to Bait with *Pasts*, or the like; and you should do well to feed the *Ducks* three or four days before, at the place where you intend to set your *Lines* and *Hooks* the better to draw them on and embolden them, and you should visit your Sport every *Morning* and *Evening*, to take in what you have caught, and to Rectifie what is a miss.

For this Sport, the *Stalking-Horse*, either Natural or Artificial, may be of great use.

CHAP. XXIX.

Directions to take Herons, Bitterns, Wild-Geese, Ducks, Swans *and the like.*

There are divers sorts of large *Fowl* that frequent *Rivers* and *Moorish places*, seeking for *Fish*, *Frogs* and such like Food that the Water affords, especially upon great *Floods*, and the like; when you perceive any such *Fowl*, to frequent a certain place, you may take them with *Hooks* and *Lines* set, and baited according to these *Figures*.

Your *Hooks* must be strong, and well tyed to your *Lines*, then Bait them in this manner, thrust the long streit part of your *Hook* into the *Mouth*, or *Throat* of the *Frog*, and let the end come out at the *Tail*, and then fasten it to the *Line*, which must be tyed to some *Bough*, *Root* of a *Tree*, or Stump; and for want of such conveniency, drive in some *Stake* to fasten it unto.

If you can get a small *Fish*, about the bigness of a *Gudgeon* it will do as well, and for some sort of *Foul* better; and therewith Bait your *Hook*, thrusting the long end in at the *Throat g*, and out at the *Fundament B*; and there fasten your *Hook* to the *Line*, and your *Line* to some *Stake* or the like, as marked *e*, the end *f* being fixed into the Ground, and the great end *e* being just covered over with the *Water*; And the first *Hern*, or *Bittern* that shall perceive it, will make at it, and devour it, and so become taken.

You must attend *Morning* and *Evening* to look after your *Baits*, and to do well you should place good store of *Hawks* in several places.

If your *Baits* do miss, and that you find the *Fowl* do resort thither; then fetch a great compass about them, and as it were gently drive them to those places where your *Baits* are set; and if they pass within sight thereof, they will come to them and be taken.

CHAP. XXX.

Several Directions for taking Hawks, *as also other Birds, with an* Owl, *or* Horn-Coot.

You must know that all *Birds* that sleep in the *Night*, are Enemies to those that take their Rest in the *Day*. Such that sleep by *Day* are the several sorts of *Owls*, the *Osprey*, &c. and when any of the Day *Birds* espy them, they gather about them both great and small, endeavouring to kill them. You may with the smaller sort of *Owls* catch good store of ordinary *Birds*, as *Sparrowhawks*, *Magpies*, *Jayes*, *Daws*, *Blackbirds*, *Thrushes*, *Sparrows*, *Lennets*, and the like: And with your great *Horn-Coot*, the *Goshawk*, *Faulcon*, *Lanner*, &c. besides the aforesaid *Birds*.

The *Horn-Coot* is a large sort of *Owl*, and keeps altogether in *Woods* and great *Forests*; he is oftimes bigger than a middle sized *Goose*, with hairy *Legs* and rough *Footed*; he hath great Tufts of *Feathers* on either side of his *Head*, bearing out like *Horns*; his *Face* is broad and large, his *Eyes* great and sparkling, and his *Voice* terrible and frighting. Having got such an *Owl*, you need want no Recreation, having first made him fit for your purpose, and to that end follow these Directions.

The first thing to be taught him is to come and feed on your *Fist*, being ready and perfect at that, put him into some *Room* or *Cockloft*, where you must place two pieces of *Timber* at each end of the *Room* one, which must be about two *foot* high, and cut on the upper-side like the Ridge of an *House*, declining on both sides, that your *Horn-Coot* may *Pearch* on them; then tye a *Cord* from one of the said *Pearches* to the other, having first drawn it through an *Iron-Ring*, or some strong *Leather-Strap*, whereunto tye a Strap about three *foot* long, and at the other End your *Horn-Coot* must be fastned by the *Legs*, just like unto *Hawks*. Your *Ring*, or *Leather Strap*, must be loose, so as to play forwards and backwards from one *Billet* to the other, that your *Horn-Coot* may divert himself when he is minded to change places. At first, place not your two *Pearches*, or *Billets*, above six or seven *foot* asunder; but afterwards you may lengthen them by little and little, as you perceive he comes on. Let him not rest at any time on the Ground, and let the *Strap*, by which he is tied, be proportioned to the height of the *Pearches*.

You must teach him to fly from one *Stand* to the other, by never feeding him on that *Pearch* where you find him, but only shew him his *food*, and

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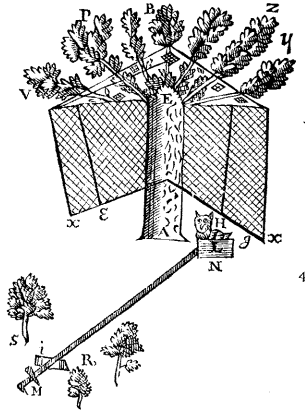
and so draw or entice him to the other; when he hath had a *Reward* of two or three Bits, remove your self to the other End, Calling him, and unless he come to the other *Pearch* give him no more; and by this means in a little time you will find he will be too quick for you, for as soon as he perceives you to move, he will fly along and get thither before you: He is then well made, and will be brought to that pass in about two *Months*.

My next business shall be, to shew you how to prepare the Place and Instruments you are to use in taking *Hawks*, and other *Birds*, by the help of your *Horn-Coot*.

Choose out some Quarter that lieth high and open, free from *Hedges*, *Trees*, or *Bushes*, only with a single *Tree*, distant at least four hundred *Paces* from any other, with a large round spreading Top, and pare away all the under *Boughs*. This *Figure* shews the whole, with the Explanation.



From *A* to *E* is the Stem of the *Tree*, cleansed from all *Boughs* about twelve *foot* round from the Ground, the top Branches being all pared away, to bring the whole into a uniform Cut, no place sticking out more than another, that your *Nets* may the freer play: If there be any void place in the *Tree*, by which a *Bird* may stoop through and stick at your *Horn-Coot* which is under it, you must there stick in some *Boughs* to fill it up; and it were not amiss if you let three or four *Boughs* below to stand out somewhat more than the rest, upon which a *Bird* might take stand, to view your *Owl* or *Horn-Coot* at the bottom of the *Tree*.

You must carefully gather up all the *Leaves*, *Chippings*, and *broken Sticks*, and put them out of sight for the avoiding Suspicion; for *Hawks* especially are very jealous and observant. Then choose out three *Boughs* from under the *Tree*, that stand in a Triangle at an equal distance, as those marked *T*, *V*, the third being just behind the *Tree*; then make a little Incision, or Cleft, with your *Knife* in the End of each of the said *Branches*; the *Clefts* should be distant about nine or ten *foot* each from the Body of the *Tree*; the intent of these *Clefts* are to receive as many little *Pegs*, which are fastned to the *Cords* of your *Net*, as hereafter in the next *Figure* shall be declared.

Then prepare two *Billets*, one of which place at *H*, *L*, about four or five *foot* from the Body of the *Tree*, which must be strong set into the Ground; the other at *I*, must be placed about an hundred *Paces* distant, and forced also into the Ground; then stick up four or five *Branches*, as *R*, *S*, about three *foot* from it for a *Lodge*, where you may withdraw with your Companions; behind each of the *Billets* drive a strong *Peg* of *Wood*, as *M*, and your place is fitted.

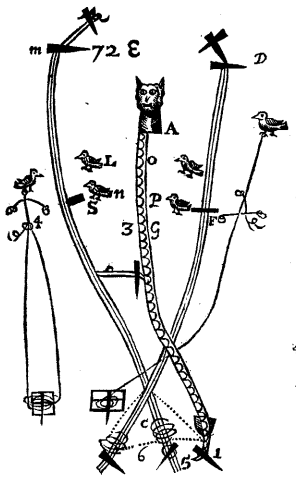
Your place being thus prepared, take your *Horn-Coot*, your *Cord*, and a *Folding-Ladder*, and get early in the *Morning* to the place. Plant the *Ladder* against the hindermost of your Triangle *Clefts*, and fix the *Peg*, which is fastned to one of the *Cords* of your *Net* into the *Cleft*, and it must be very gently thrust in; then remove your *Ladder* to the Branch *V*, *P*, and gently thrust into the *Cleft* the *Peg* that is at the other end of your *Net*. Then carry your *Ladder* to the Branch *T*, *Z*, and put into the *Cleft T*, one of the *Pegs* of the other *Net*; the other *Peg* of your second *Net* must be fastned into the Cleft of the *Branch* which is behind the *Tree*; then your two *Nets* are set in *Triangle* above, as appears by the *Letters* below *X*, *E*, *A*, *g*, *X*. Then remove your *Ladder* into some Private place, or fasten it on the backside of your *Tree* to lye close.

The next thing to be done is, to draw your *Line* between the two *Pearches*, *viz.* from *H* to *I*, with your *Iron-Ring*, or *Leather-Buckle* clapt on it, for your *Horn Coot* to move in and out as you see occasion; fix the End of the *Line* over the *Billet I*, at the *Stake*, in the *Lodge M*. Every thing being thus disposed, withdraw your self, and watch your *Horn-Coot*, to observe if he discovers any thing; for you shall sooner discern by his *Eye* than your own, whether any *Bird* be stiring or not. When you find him turning his *Head* a little on one side, with his *Eyes* aloft, give him a little twitch, and make him forsake the *Pearch*, or *Billet I*; for on that he must be first placed, and he will fly along after a heavy manner, to rest himself on the other *Billet*, or *Pearch*, under the *Tree*. The *Bird* that was passing by having once discovered him, will presently stoop at him, and perceiving the *Tree* will take a *Stand*, to consider his strange Countenance, and resolving to set on him, Casts himself into one of the *Nets*, which soon falleth down upon him; and you must be nimble to take him out, that he bruise not his *Feathers*, nor over-heat himself by *Bating*, and send him away; then set your *Net* as before, and withdraw

draw your *Horn-Coot* to your *Lodge* again on the *Pearch I*.

The *Nets* to be used are the same with that mentioned in the Twenty fifth *Chapter*, where it is at large described.

The Preceding Device is very good, but that which is designed by this following *Figure* is much better, in regard there is no need of any *Tree*, and also because you may by this take two or three, nay twenty at one time; and likewise in regard the *Birds* which now come to your *Horn-Coot*, have no *Pearch* to stand and gaze, whereby they may hazard the discovering of your intent. Furthermore, if five or six *Hawks*, or other *Birds*, should be at once in your *Tree*, you may expect to take but one, and probably the worst of them all.



This *Figure* is much the same with that for taking *Plovers*, already at large discoursed of.

For taking of *Hawks* use a double *Platform*, of which I have also treated; only in the placing of these, your *Nets* must play the one on this side, and the other on that side; whereas for *Plovers*, they both play one way. For Example, When you draw your *Cord* of the *Net*, the side *M*, falls on the Point 2, and other 4 upon 3, to the end that the *Bird* that strikes at the *Owl*, or *Horn-Coot*, may be sure to be taken, on what side soever it come.

You see where to place the two *Pearches*, *viz.* one at *A*, and the other at *D*. You must at first place your *Horn-Coot* on that by your *Lodge*, and when you find by him that he discovereth any *Bird*, force him from you that he may fly to the other *Pearch A*, to give a full opportunity of discovering himself.

In case you have any *Stale Pies*, or *Jays*, they will be also great helps to call in other *Birds*; and remember this thing, that in case you see any *Bird* which you desire to take, if he come on the Right hand, you must take him with that *Net* which is on your Left hand, and so on the contrary.

Having hitherto treated of the taking of *Hawks*, as also other *Birds* with an *Horn-Coot*; I shall next proceed to treat of the taking *Hawks* several other ways, and of all *Ages*, especially of such as are most frequent in our Kingdom, as the *Goshawk*, *Sparrowhawk*, *Merlin*, *Hobby*, *Castrel*, and the like; all which have their *Ayries* and Breed here, though not esteemed so good as the Beyond Sea ones, especially the *Gosshawk*.

There are likewise some *Hawks*, that by some Accident or other come into this Kingdom wild, and others break out of the *Mew*, or by Misfortune are lost, and Breed here.

Hawks are taken three several ways, and at as many several Seasons; to wit, from the *Ayery*, after they be disclosed, at which time they are called *Eyasses*, or after they be full *Summed*, and begin to leave their *Nest*, at which time they are called *Branchers*; or after they have preyed for themselves, and then they are called *Sore Hawks*, or *Hawks* in their *Sorage*.

The Taking Eyasse-Hawks.

For the taking these *Hawks* (which is as soon as they be disclosed, and have cast off the first *Down* which covereth their *Feathers*) there is no difficulty to be used, more than finding out the *Ayery*, or *Nest*, which is amongst the tallest *Trees* that grow in the thickest *Coverts*, and are most remote from *Paths*, or frequented places; and when you come where the *Ayery* is, you may know it by the *Mutings* and *Slicings* of the Old ones about the said *Ayery*, and at the *foot* of the *Tree* you will find much *Plumage*, *Feathers*, and *Bones* of *Birds*, so that if you watch near the said place early in the *Morning*, or at the close of the *Evening*, you may see the *Male* bring in Prey for the *Female* that setteth on the *Nest*.

Having thus found the *Nest*, about *Mid-day* (being the time that she riseth to *bathe* and solace her self) you may climb up the *Tree*, and look into the *Nest*; to see how many *Eggs* she hath, or whether Young ones; but be sure do not touch either, for that will make her forsake the *Ayery*. And when the Young ones are about ten Days old you may take them away, and bring them up with warm Meat, and live *Birds*, till they be full *Summed* and hard *Feathered*, and after that you may *Reclaim* and *Man* them as you find occasion, according to the Directions given in the Treatise of *Hawking*.

These *Hawks* are called *Eyasses*, as taken out of the *Nest*; but this is not the best Season for taking *Hawks*, for they can't be so naturally

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fed as by their *Damb*, nor so well kept and ordered.

The next Season for the taking young *Hawks* is when they are *Branchers*; that is, when they are hard *Summed*, and begin to forsake their *Nests*.

To take Branchers.

For the taking of *Branchers* with *Nets*, observe this Method: Having found out an *Ayery*, or *Nest*, be there very early in the *Morning*, to watch the rising of the Old *Hawks* to fetch Prey for their Young ones, and soon after their departure you shall see the Young ones fly forth upon the *Boughs* and *Branches* of the *Trees*, skiping up and down to exercise their *Wings*. Now the thing to be observed is their *Nests*, which is ever one and the same: then climb up the *Tree*, and being provided with several little *Nets* about two *foot*, or two *foot* and an half square, which must be made of strong twisted *Thread*, and dyed of the colour of the *Leaves*, for fear of frighting them, place one of those *Nets* about the *Nest* half circular, leaving one passage for their going in and out; and let it be placed about a *foot* and an half above the *Nest*, *Penthouse wise*, and in such secret manner at a distance from the *Net*, that it may not be perceived by the Old ones. Let your *Net* be a *rouing Net*, so drawn upon a strong *Line*, that when any thing shall strike against it, it may run together like a *Purse*, and enclose and keep fast the thing taken: and to that end make fast the strong *Lines* to some Branch of the *Tree*, that when they are taken they may not fall to the Ground, but hang fettered in the *Net*, without bruising themselves, or breaking their *Feathers*, which is much to be regarded.

Having thus placed your *Net* about the *Nest*, then place some others of the same size and fashion between the thickest and usual *Branches*, through which they pass in and out to their *Nests*, especially at that place where you saw the Old ones make their passage out; and let them be placed more uprightly, and fasten the strong *Lines* to some *Branches* as aforesaid.

Your *Nets* being thus placed, which are to be done with all hast imaginable, for fear of the Old ones coming, you must descend the *Tree*, and place your self in some secret place, that you may not be espyed by either the Old or Young *Hawks*, yet so as you may have sight of them; and when the Old ones brings them Prey, they flock about her to the *Nest* for it, so that as many as touch the *Nets*, become entangled; and those that escape are taken oft times at their coming out. Those that are so taken fetch not down until the Old one is departed, and the other Young ones are come out for fear of affrighting them from their *Nest*, and so lose the taking them; and be sure not to break or bruise any of their *Feathers*, in the taking them out of the *Nets*; and you should be provided with some *Rutter-Hoods* to put on their *Heads*, which will make them quieter from struggling.

To take Hawks in their Soreage.

This Season is from the time they have Preyed for themselves, until the first year be expired, and that they have *Mewed*. For the taking them you must well know their *Ayerie*, and diligently observe their *Mornings* and *Evenings* going forth for *Prey*, as also their returning home, and where they take their Stands; for *Hawks* of all *Birds* are the most constant to their wonted places. Therefore being thus acquainted with their times of going out, and the places where they sit at their return, take the advantage of their going out for *Prey*, and climb up the *Tree* where their Stands are, and in the strait places where they must pass, take a pair of those *Nets* called by *Falconers*, *Urines*, or *Urnes*, which for shape are not much different from those you are to use for the taking of *Branchers*; but they are much more larger, and more hollow in compass, with a large *Mesh*; they are made of strong Twisted brown *Thread*, and dyed *Green* as aforesaid; but being common to be bought at *Net-makers Shops*, I shall say no more of them.

These *Urines* or *Nets* place in the several passages, and in divers *Trees* round their Stand, so that let them come which way they will, you may meet with some of them, and place your self in some secret place, as before directed, to watch their taking, for fear of hurting themselves; and when you have taken them down, *Hood* them as aforesaid.

But if it happen that this taketh no effect, then fix *Stales* under your *Nets*, of such *Birds* either great or small as you see they *Prey* upon; and these *Stales* tye at such a convenient liberty, that they may flutter up and down within the compass of the *Net*. Then about Day-break when the *Hawk* begins to rouze her self upon her Stand, and to gaze about according to their Nature; and hath cast up her *Casting* of *Plumage*, or *Feathers*, and being sharp and hungry, will soon espy your *Stales*, and with all eagerness make them her *Prey*, by which means she will become intangled in the *Nets*; and by this Device you may take all the *Ayerie*, provided you be not too rash, by getting up the *Tree*, to take that down, and so affright the rest away.

To take Hawks with Lime-Rods, or a Lime-Bush.

There are some that for taking of sore *Hawks* do use *Lime-Rods*, or a small *Lime-Bush*, artificially made of five Twigs, gently fixed into a little *Socket* of Wood made like a *Handle*, that so soon as any thing toucheth or striketh them, they presently depart from the *Socket*, and clap close to the thing that it toucheth, and so become intangled; those little *Bushes* are artificially placed about the Stand where the *Hawk* useth to sit, compassing it so about, that she can't come to the Stand without intangling.

As for the single *Lime-Rods*, they must be fixed to the nearest *Branches* to the *Stand*, coming slope-wise so near the *Stand*, that she can't come in without touching them, and so become intangled. These *Lime-Rods* are to be placed, not only about he *Stand*, but also in and about all *Passages*, through which she cometh to her *Stand*; and they must be artificially placed, that she may not distinguish them from the Natural *Twigs* of the *Tree*.

These single *Lime-Twigs* or *Rods* must be about a *Foot* and an half long, and about half ways *Limed*; but those used for the *Bush*, must be about twelve or fifteen small *Rods* in a Cluster, and so placed that one may not touch another; which *Twigs* must be about six *Inches* long, of which *Lime* four *Inches* towards the top.

But although this manner of taking *Hawks* is very certain, and not much troublesom, yet it is not so good and neat, by reason of besmearing their *Feathers* with the *Lime*; therefore for the cleansing their *Feathers* from the *Lime*, have very fine clarified *Capons Grease*, or *Goose Grease*, anointing therewith the Limed *Feathers* very well, then take of the finest *Hourglass Sand*, and scatter it thick upon the *Ointment*; and having warm *Water*, either *bath* the said places, or with a soft *Spung* dipt into the said *Water*, *bath* the *Feathers* therewith, working them betwixt your *Fingers*; by which means you will get off all the daubed *Lime*, and perfectly cleanse the *Feathers* from the same.

Taking Hawks with a Dark Lanthorn.

This way is very good and sure for single *Hawks*, as well Young as Old. Observe this Method. Having found the *Stand* of a *Hawk*, in the dead of the Night when it is very Dark, get a *Dark Lanthorn*, and turn the Light just before your Face, and against the *Hawk*, by which means your Face will not be seen by the *Hawk*, and make as little noise as possible; and by this Device you may come unto her, and take her from her *Stand* with your *Hand*; for the Light doth cast an Amazement unto her, and it were not amiss if you covered your Face with a piece of thin *Green Silk*; for nothing is more affrightful to them, than the Face of a Man.

This way is good to take all *Hawks* that through ill *Reclaiming*, or otherwise do escape, and break away, and so become Wild.

Concerning the Stands *of Hawks.*

If it be a *Day-Stand*, you shall find about it nothing but *Mutings*, and *Slyings* without any mixture of Matter. And if it be a *Night-Stand*, you shall find lying amongst the *Mutings* many and divers *Castings* of *Feathers*, *Plumage* and the like, which you may know to be a *Hawks* from other *Fowl*, by the bigness, proportion and Substance. Also by the difference of the *Castings*, you may know if it be her present or former *Stand*; if her present, then you shall find *Castings* of all Natures, as some altogether dry, some about three parts dry, others half dry, some less; and probably her *Casting* that Morning. But if it be her forsaken *Stand*, then all the Castings will be dry, old and withered. And thus much concerning the taking of *Hawks*.

CHAP. XXXI.

Of Singing Birds, *and how to preserve and keep them.*

Having thus largely Treated of the taking both *Land* and *Water Fowl*; It will not be unnecessary to Treat of such *Singing Birds* as are of most esteem amongst us, with some short Directions how to keep them; and first with the *Nightingal*.

The Nightingal.

This *Bird* by most is esteemed the Queen of all *Singing Birds*, as well for her sweet as various charming *Notes*, which she (though but small) loudly warbles forth, and generally in such places near unto *Houses*, and frequented places. They begin to appear about the beginning of *April*, and where their Winter Habitation is, none knoweth, but 'tis supposed by some that they sleep all that Season.

She makes her *Nest* in *Quickset Hedges*, or the like places, not far from the Ground, and *Hatcheth* her young about the beginning of *May*, and the earlier the young ones are hatched, they are esteemed the better. They should be taken out of their *Nests* when indifferent *Fledg*, for if well *Feathered*, they (as all other *Birds*) will become sullen and dye, and if too little or callow, they are tender and also in danger of dying.

For their *Meat* give them *Sheeps Hearts*, or *Bullocks Hearts*, but take off the fat skin that covereth it, as also the Sinews; then soke the like quantity of *White-bread* in *Fair Water*, squeezing out some of the Water, and mince them small together, and give it them on the point of a *Stick*, as much at a time as is sufficient. When they are old enough to fly out of the *Nest*, put them into a *Cage*, with several *Pearches* to sit upon; and let them be lined with green *Bays*, for at the first they are very subject to the *Cramp*, and at the bottom of the *Cage* put in some *Moss*, or fine *Straw*; and it were not amiss if their *Cages* were lined in the Winter, otherwise they must be kept in a warm place. At their first *Caging* put amongst their Meat *Ants Egs*.

In Summer every day feed them with fresh Meat; when they begin to *Moult*, let their *Meat* be hard *Egs* and *Sheeps Hearts*, of equal quantities mixed together with *Saffron* and *Water*, but by the way take notice that *Duck-Egs* will kill them: Sometimes you may give them *Catterpillers*, *Red Worms*, *Hogs Lice*, or *Meal Worms*.

As to their *Diseases* and *Cures*, observe that at the latter end of *August* they grow very fat, as well those abroad, as those in *Cages*. When their fat abates and they cease *Singing*, 'tis an ill sign; therefore keep them very warm, and give them *Saffron* in their *Meat* or *Water*. When you perceive the growth of their fat, purge them thrice a week for a Month, either with a *Worm* usually

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ly found in *Dove-Houses*, or with a Speckled *Spider*, which you may find about *Vines*, or *Goosbery Trees*, about *August*, and at no other time.

If they are *Melancholy*, put into their *Drinking Pot*, some *Liquorice*, with a little White *Suger Candy*, and let their Meat be *Sheeps-Hearts Shred*, some *Meal-Worms*, and hard *Egs* mingled with *Pismires*.

If you keep them not clean, so that their *Feet* are clogged, their *Claws* will rot off, and they will be subject to the *Gout* and *Cramp*, and take no delight in themselves; therfore keep the *Cage* clean and handsome, with good dry *Sand* in the Bottom.

For the *Cure* of the *Gout*, take Fresh *Butter*, and Anoynt their *Feet*, Four or Five Days, and it will cure them.

They are also troubled with *Apostumes*, and breaking out about their *Eyes* and *Neb*, for which use *Capons Grease*.

The way to take Nightingals.

FOr Young ones observe where the *Cock sings*, and if he *Sings* long the *Hen*, is not far off, and when you come near the *Nest* she will *Sweet* and *Cur*; if notwithstanding you can't find the *Nest* stick a *Meal Worm* or two upon a *Thorn*, and retiring into some place out of sight, observe which way it is carried by the Old one, and approaching you will hear the Young ones, when she feeds them. Having found the *Nest*, do not touch them, for then they will not tarry in the *Nest*.

The way to take *Branchers*, is thus; scrape in the *Ditch*, or *Bank-side*, the Earth about three quarters of a *Yard* square, that it may look fresh; then take a *Bird-Trap* or *Net-Trap*, which make after this fashion.

Take a *Net* made of *Green Thread*, or rather *Silk*, which should be about a *Yard* in compass, and made after the fashion of a *Shove-Net* for *Fist*; then get some large *Wire*, which bend round, joyning both ends together, which put into a short Stick about one *Inch* and an half long; then take a piece of *Iron* with two *Cheeks*, and a Hole on each side, through which put some fine *Whip Cord* three or four times double, the better to hold the piece of Wood unto which the ends of the *Wire* are put; and with a Button on each side the *Iron* twist the *Whip-Cord*, to the end the *Net* may play the quicker. You must fasten the *Net* to the *Wire* as you do a *Shove-Net* to the *Hoop*, then get a *Board* the compass of the *Wire*, and joyn the two *Cheeks* of *Iron* at the Handle of your *Board*, and make a Hole in the middle thereof, and put a piece of Stick, about two *Inches* long, and a Hole at the Top of your *Stick* where you must have a Peg to put in with two *Wires* an *Inch* and a half long, to stick your *Meal Worm* upon, then in the middle of the Top of the *Net*, tie a String, drawing the *Net* up, having an *Eye* at the end, of the Handle to put your *Thread* through, and pull it till it stands upright, then pull it through the Hole of the Stick that stands in the middle of your Board, and put your *Peg* in the Hole, to hold the String of the *Net*, that it can't fall down; upon the *Wires* put two *Worms* before you put it into the Hole, and set it as gently as you can, that it may fall down upon the first touch of the *Nightingals* approach. Then having scraped the place, your *Net* and *Worm* being in a readiness, put some *Ants* in your *Trap-Cage*, and upon the *Board* put some *Worms* upon *Thorns*, and set them at the bottom of the *Trap-Cage*, to which end little Holes should be made to stick in the Ends of the *Thorns*. Then plant your *Trap* near the place where you heard them Call, be it in the *Ditch*, by the *Bank-side*, or Corner of a *Hedge*, and you need not fear of catching some. You may set what number of *Cages* you think convenient, the more the better.

Having taken any, tie the ends of their Wings with strong *Thread*, to dissable them from bruising and hurting themselves against the Top and Sides of the *Cage*; and to that end, it were convenient to let the *Cage* be lined with *Green Bays*.

For Four or Five Days until they are Reclaimed, let them not be disturbed with Company, as little as may be; let their *Food* be *Sheeps-Hearts*, and hard *Egs* finely shred, and mixt together, with *Red Ants*, and a few *Red Earth-Worms* will not do amiss. At the first taking them they will Eat nothing but living things, as *Worms*, *Ants*, *Flyes*, *Catterpillers*, and the like; But if through fullness they will not Eat, then open their *Bills* and force them, strewing some of the said Meat at the bottom of the *Cage*.

Those *Nightingals* that are taken in *July*, or *August*, will not sing till *middle October*, and then they will hold in Song till *June* following; but those taken in the begining of *April* are esteemed the best for *Song*. Those *Birds* that *Sing* before they feed, are generally excellent; but those that are long a feeding, and do not begin to Sing, are not worth the keeping.

Cocks are thus known from *Hens*; the *Cock* is said to be longer and bigger than the *Hen*; to have a greater *Eye*, a larger *Bill*, and a *Tayl* more reddish: But take this for a certain *Rule*, that if any of your *Nestlings*, before they can feed themselves, do *Record* a little to themselves, and in that *Recording* you perceive their *Throats* to *Wag*, it is a sure sign they are *Cocks*.

Brainchers, when they are taken and do Feed, whether *Cocks* or *Hens*, will *Record*; but the *Cocks* do it much longer, louder, and oftner.

CANARY BIRDS.

THese *Birds* take their name from the place from whence they first came, *viz.* from the *Canary Isles*; but of late years there is a sort, (but not so good) that are brought from *Germany*: And there are some that are curious in this Diversion in their *Aviaryes* that breed them in *England*, which are excellent, surpassing all others; but the keeping and ordering them is troublesome,

These *Birds* being of such esteem for their pleasing *Notes* are much prized, so that as a *Merchandize* they are brought over and sold by certain *Shop-Keepers* about *Billings-gate*, in *London*, for Ten, Twelve, or Fifteen shillings a piece, more or

or less, according to the goodness and excellency of their *Notes*, there being a great difference in them.

If you would know whether they are in health before you buy them, take them out of the *Store-Cage*, and put them into a Clean *Cage* alone; and if they stand up boldly without crouching or shrinking their *Feathers*, and looks with a brisk *Eye*, 'tis a sign they are in Health; but if they *Dung* very thin and watry, or of a slimy White, without, any Blackness in it, 'tis a sign of Death,

They are Subject to many *Diseases*, as *Impostumes*, which afflict the *Head*, and will cause them to fall suddenly from the *Pearch*, if not speedily Cured.

The most approved *Medicine* is to make an Oyntment of *Fresh Butter*, and *Capons-Grease* melted together, and anoynt the infected place therewith Three or Four Days together, and when it is soft, open it gently and let out the Corruption, then anoynt the place with some more of the said *Oyntment*, and it will perfect the Cure in a short time; and during the time of the Cure give them *Figs* and *Liquorice*, with *White Suger-Candy* in their Water.

The LINNET.

THis is a pretty *Bird*, and for a sweet and pleasing *Note* takes place next to the *Canary Bird*, and were it not so common would be of great esteem; the feeding the *Nestlings* is with *White Bread* soaked in *Milk*, or *Water*, with bruised *Rape-Seed* mixt of the like quantity, and let it be fresh made every day, for that which is four will breed *Diseases*; this Meat give them on the Top of a Stick as often as occasion serves to feed them.

If you would have them to *Whistle*, you should *Whistle* to them in the time of feeding them, and the best is with a *Flagelet*, observing constant *Tunes*, and what *Bird* soever you would have him to learn his *Note*, under that *Bird* let him hang, and he will perfectly imitate him, especially the *Canary Birds Notes* exactly.

The *Cock* is known from the *Hen* by the *Breast*, which is redder, and his *Back* is browner, with *White* under his *Wing*, *viz.* the fourth, fifth and Sixth Feathers.

His usual Food is *Rape* and *Canary-Seed* mixt together, with little *Hemp-Seed*. And blow off the *Husks* every day from the *Seeds* in the Drawer of his *Cage*, and betwixt the *Wire* put some *Chalk* to rub his *Bill*, also a *Lump* of *Suger* is very good sometimes to pick upon; the *Dutch-Seeds* are esteemed better than the *English*, as being thiner skin'd.

Many are the *Diseases* of this *Bird*, as *Convulsions* of the *Breast*, *Pissick*, known by the panting, staring of his *Feathers*, and lean *Breast*; which distemper happens for want of fresh Water, or green Meat, as *Chick-Weed*, or the like; in the Spring sometimes he is troubled with *Hoarseness* in his *Voyce*, by over-streyning to sing, but of all *Diseases*, *scowring* is most dangerous, and if it is clammy, it is mortal. *Saffron* is very good to give them in their Water, and *Suger-Candy*.

The Robbin Read-Breast.

THis *Bird* being so innocent and harmless is most beloved, and of all others is the most familiar, coming into the *Houses* to eat Crums of Bread; and for a sweet and changable *Note* is little inferiour to the *Nightingal*, or *Canary-Bird*; besides it is very tractable to *Whistle*. They breed generally thrice a year. Those that you intend to keep should be taken from the Old ones before they are much fledged, otherwise they will be sullen and dye; and being a tender *Bird* are to be kept in *Cages* lined with *Bays*. They are to be feed in all respects as the *Nightingal*.

In the bottom of the *Cage* put *Mosse* for warmness. If you would have them learn to *Whistle* use the *Flagelet* that hath a small fine *Note*.

The way to take the Old ones is both easy and common, which you may do either with a *Pitfal*, or with a *Trap Cage*, bought at any shop that sells *Cages*, and in the said *Cage* you may put for a Bait some little *Worms*, *Crums* of *Bread*, or the like.

The *Cock* hath his Breast of a darker *Red* than the *Hen*, and it goeth further up upon his *Head*.

The WOOD-LARK.

THis *Bird* for its excellent, pleasant, and various *Notes*, is held in great esteem. They Breed very early in the Year, and make their Nest in *Lair-Ground*, where the *Grass* is rank and russet, under some large *Tufts*, to shelter them from the *Cold*. 'Tis a very difficult *Bird* to take from the *Nest*, and so to breed up, generally dying of the *Scouring*, or *Cramp* in a short time after they are taken out of the *Nest*; so that the best way were to take the Old ones, or *Branchers*, before *Moulting-time*; the chief Season being in *June*, *July*, and *August*.

The way to take them is with a *Hobby*, after this manner: Go out in a *Dewy Morning* to the sides of some *Hills* that lye towards the rising of the *Sun*, where they most usually frequent; and having Sprung them, observe where they fall; then furround them twice or thrice, carrying your *Hobby* on your Fist, causing him to hover as you draw near, by which means they will lye still until you clap a *Net* over them, which carry on the Point of a *Stick*. If you would take three or four together, have a *Net* made like that for *Partridge*, only with a smaller *Mesh*, and carrying your *Hobby*, as aforesaid, which will serve you as the *Setting-Dog* for the *Partridge*, and with your *Net* at one Draught you may take them all: But those taken in these *Months* are not so good for the *Cage*, as those taken in *February*, or *January*, as not holding their *singing* so long.

Upon your first taking them, put into the *Cage* two *Pans*, one for minced Meat, and the other for *Oatmeal*, and whole *Hempseed*; then having boiled an *Egg* hard, take the Crums of *White-bread*, with the like quantity of beaten *Hemp-seed*, and mix them altogether, mincing

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the *Egg* very small, and give it them to eat. At the bottom of the *Cage* should be fine *Gravel*, and be sure to keep the *Cage* clean, and shifted every three or four *Days* at least with fresh *Gravel*, which they much delight in. If you would have them *sing* loud, and much, feed them with *Sheeps Hearts*, hard *Eggs*, and *Hemp-seed* bruised, mixed together, and put into the Water a little *Liquorice*, white *Sugar Candy*, and *Saffron*, once a Week.

If in the beginning of the *Spring* you find them grow poor, give them for two or three days a Tuft of *Three-leaved Grass*, as is used to the *Sky Larks*; also some *Sheeps Heart* boiled, and mixed with *Bread*, an hard *Egg*, and bruised *Hemp-seed*, as before directed.

If those *Birds* taken in *January*, or *February*, Sing not within a Month, 'tis a sign they are either *Hens*, or will not be worth the keeping. Now for the knowing a *Cock* observe these Rules; His tail *Hanging*, the largness and length of his *Cuish*, and the doubling of his *Note*, called *Cudling* in the Evenings.

These *Birds* are very subject to *Lice*, the *Crabs*, and *Giddiness* in the Head. The best Cure for *Lice*, is to take them out of the *Cage*, and smoak them with *Tobacco*; then put fresh *Gravel* into the *Cage*, and let them in an hot place where the *Sun* shines, that they may bask themselves in the *Sand*. Do the same also, shift the *Cage* with fresh *Gravel*. And for the *Giddiness* in the *Head*, it proceeds from giving them too much *Hemp-seed*. For Cure, Give them some *Carduus*, *Fig Leaves*, and *Parsnips*, with the *Eggs*, all put into Water.

The SKYLARK.

The *Sky Lark* is more hardy than the *Wood Lark*, and his trouble to keep; but the *Joy* to give them is much the same, as hard *Eggs*, *Hemp-seed* bruised, *Bread* and *Chickweed*; and always let there be kept in the *Cage* a Tuft of fresh *Grass*.

They Breed in *Corn-fields*, or in high Tufts of *Grass* in *Meadows*, and seldom have Young ones till Mid *May*.

They are taken several ways, as already is treated of in a *Chapter* relating to the Taking them, to which I refer you.

The THROSH or THRESH.

There are said to be five kinds of *Throshes*, viz. the *Mistle Throsh*, the *Norfolk Throsh*, the *Wood-ousel*, the *Heath Throsh*, and the *Wood-ousel Throsh*.

The *Woodcock Throsh* hath great variety of pleating, Notes, and sings about nine Months in the Year. They generally Breed three times in a Year, beginning early; but the first *Birds* usually prove the best.

The Young ones may be taken from the Old at about fourteen days, keep them dry and clean from their Dung, and feed them with *raw Meat* and some *Bread* mixt together, with bruised *Hemp-seed*, washing the *Meat* before you mingle it with the *Meat*; and let them have always fresh *Water*, and the bottom of the *Cage* kept clean, otherwise they will be troubled with the *Cramp*.

The BLACKBIRD.

This *Bird* by the ordinary Country People is in much esteem, but not for its pleasant *Note*, nor its long continuance in Singing, scarce exceeding three *Months*. Their *food* is much the same as for the *Throsh*, and are to be so ordered.

The STARLING.

This is a very docile *Bird*, and if taken out of the *Nest* young is apt to learn both to *Talk* and *Whistle*. 'Tis a hardy *Bird*; their *food* is *Sheeps-Hearts*, or other *raw Flesh*, hard *Eggs* minced, *Hemp-seed*, wet *Bread*, and the like.

CHAP. XXXII.

Of the WATER-SPANIEL, How to Train and Order him for the Game, useful in Fowling.

The *Water-Dog* is of such general use, and so common amongst us, that there needs no great description of him; but there are great differences amongst them, as well in Proportion as otherwise. As to *Colour*, the Curious will make a difference, as the *Black* to be the best and hardiest, the *Spotted* or *Pied* quickest of *Scent*, and the *Liver-brown* swiftest in *Swimming*; but in truth *Colour* is nothing material, for without doubt there are good and bad of all *Colours*, and that by Experience is found: But his *Breeding, Training-up*, and the coming of a good *Kind*, are the chief things; yet it must be conferred, that as to handsomness the *Colour* is to be regarded, so is the *Proportion* as to his Shape: and then his *Head* should be round, with curled *Hair*, his *Ears* broad and hanging, his *Eyes* full and lively, his *Nose* short, his *Lips* like unto an *Hounds*, his *Neck* thick and short, his *Shoulders* broad, his *Legs* strait, his *Chine* Square, his *Ribs* with a compass, his *Buttocks* round, his *Thighs* brawny, his *Reins* gaunt, his *Pasterns* strong, and *Dew-clawed*, and his *Fore-feet* long and round, with his *Hair* in general long and curled, not kemb'd and thagged; for the first the weth hardiness and strength to endure the *Water*, and the other much tenderness and weakness.

Now for the **Training and Bringing him up**, you can't begin too Early, I mean, to teach him *Obedience* when he can but Lap, for that is the principal thing to be learnt; for being made to Obey, he is then ready to do your Commands: Therefore so soon as he can Lap, teach him to *Couch*

Couch, and *Lye close*, not daring to stir from that posture without your Command; and the better to effect this, always cherish him when he does your Will, and correct him when he disobeys; and be sure observe, that in the first Teaching him you never let him eat any thing, but when he does something to deserve it, that he may thereby know that *Food* is a thing that cometh not by chance, or by a liberal Hand, but only for a *Reward* for well doing; and this will make him not only willing to Learn, but apt to remember what he is taught without Blows; and to that end, have no more *Teachers* or *Feeders* than one, for Variety breeds confusion, as teaching divers ways, so that he can learn no way well.

Another thing is, You must be very constant to the Words of Direction by which you teach him, chusing such as are most pertinent to the purpose, and those Words that you first use do not alter, for *Dogs* take notice of the *Sound*, not of the *English*, so that the least alteration puts him to a stand: For Example, If you teach him to *Couch* at the Word *Couch*, and afterwards would have him *Couch* at the Word *Down*, this will be an unknown Command unto him; and I am of Opinion, that to use more Words than what is necessary, for one and the same thing, is to over load his Memory, and cause Forgetfulness in him. (And this Method should be observed as to the *Setting-Dog*.) You must teach him also to know the Word of *Correction*, or *Reprehension*, for no *Lesson* can be taught without a Fault, and no Fault should escape without Reprehension at the least of Chiding, and in this be as constant to a Word, as *Go too Sirrah*, *Ha Rascal*, or the like, which at first should be used with a *Lash*, or *Jerk*, to make him know that it is a Word of Wrath or Anger; neither must such Words proceed from you lovingly or gently, but with Passion, and Roughness of Voice, together with Fierceness of Looks, that the *Whelp* may Tremble when he hears you thus speak to him.

You must have certain Words of *Cherishing* when he doth well, that he may be thereby encouraged, as *That's a good Boy*, *Well done*, or the like, using therewith Chearfulness of Speech, with Actions of Favour, as *Spitting in his Mouth*, *Clapping him on the Back*, and the like. You must also use some Words of Advice, that when he is at his Sport he may the better perform the same, and may serve as a Spur to put him forward with more Chearfulness of Spirit, as *Take heed*, *Hem*, or the like.

When your *Whelp* is brought to understand these several Words, *viz.* of *Instruction*, *Correction*, *Cherishing*, and *Advice*, and that he will *Couch* and *Lye down* at your Feet, how, when, and as long as you please, and that with a Word or Look only, then teach him to Lead in a *Line* and *Collar*, and to follow at your Heels, without coming too close, or hanging back; and the meaning of this is, to teach him to be the more Familiar and Obedient unto you.

Having brought him to perfect Obedience, to follow you in a *Line*, the next thing must be to make him Follow you in the like Nature loose, without a *Line*, and always to be at your *Heels*, and to lye down by you without your leave to the contrary; and this is as necessary a *Lesson* as can be taught him, for he must be so but upon especial occasion, as to raise up *Fowl* from their *Haunts*, and to find out and bring such as you have *shot*, or *killed*, unto you.

The next *Lesson* to learn him is to *Fetch* and *Carry* any thing that you shall Command him, and this you may begin to teach him by the way of Sport, as by taking your *Glove*, and shaking it about his *Head*, making him to catch at it, and to play with it; and sometimes let him hold it in his *Mouth*, and strive to pull it from you; then cast it a little way from you, and let him Muzle it on the Ground; then take it from him gently, giving him Cherishing words, as *That's a good Boy*, *Well done*, or the like. After you have spent some time in this, and that you find him to take it from the Ground, and to hold it in his *Mouth* as it were for you, then begin to cast it further and further, giving him your Command, saying *Fetch*, or *Bring it Sirrah*; and if he brings it, then Cherish and Reward him with *Meat*, or a *Crust* of *Bread*, and let him have no *food*, but what he deserves by doing this *Lesson*, and by your continual Practice he will fetch your *Glove*, or any thing else you shall throw out for him.

If at any time he offers to run away with your *Glove*, or to toss it up and down wantonly, not bringing it to you orderly; then first give him your Word of *Instruction*, and if that will not do, your Word of *Correction*, and if neither avail, then proceed to Blows, and give him nothing to eat as a *Reward* until he doth as you Command. When by this means you have made him perfect, and that he will fetch your *Glove* readily where e're you throw it, bringing it to you although in Company, and all call him to come to them, you must then make much of him, and *Reward* him very well: And having Trained him up to fetch your *Glove*, then proceed to teach him to *fetch* whatsoever you throw from you, as *Staves*, *Nets*, *Stones*, *Money*, or any thing that is portable.

Also teach him to carry live or dead *Fowl*, and with a tender *Mouth*, that when you have occasion to use him for the Sport, he may bring them to you without tearing, or so much as bruising a *Feather*.

And as you walk with him in the *Fields*, drop something behind you unknown to him; and being gone a little way send him back to seek it, by saying, *Back Sirrah*, *I have lost*; and if at first he stand amazed urge him still, and cease not by pointing to him the Way you would have him go, until by seeking out he finds that which you so dropt, which make him take up by saying *That's it*, and to bring it after you; then drop it again, going twice as far as formerly, causing him to go back to seek it, not leaving him till you have made him find it, and bring it to you; for which *Cherishs* and *Reward* him, and where he fails there *Chastise* or *Chide* him, sometimes with *angry Words*, other times with *Blows*, and

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and sometimes keep him *Fasting*, according to his Offence; and thus do until he will hunt the way back which you went, were it above a Mile.

But if your *Dog* happen to bring to you a Wrong thing, you must receive it from him, and *Cherish* him; but send him back presently again, saying, *Away again*, or *I have lost more*, and be not satisfied until he bring you the right thing; and if he return without any thing, then be sure both to *Chide* and *Beat* him for his Sloth and Negligence.

When he will thus *Fetch*, *Carry*, and *Find* out things thus lost, then Train him to *hunting*, beginning first with *Lame fowl*, which by your help, (when they *Drive*, or otherwise) you may with little labour make him take, which will much hearten and encourage him to the Sport. After this make him use all his *Cunning* without your assistance, whether he gets or loseth the *Game*, and according to his desert *Reward* or *Correct* him; and by this Practice he will become *Master* of his *Game*; and be sure always that he brings his *Game* (when taken) to the *Shoar* unto you, without hurting it.

Your next business shall be to Train him unto your *Fowling Piece*, causing him to follow as it were step by step behind you, and under the Covert of your *Shadow* until you have *Shot*, or else to *Couch down*, or *Lye close*, where you appoint him, by saying *Lye close*, until you have *Shot*: and then upon the least Notice or Beckon, speedily to come, and to do what you Command.

Some *Dogs* are so expert as to have their *Eye* on the *Game*, and upon a *Guns* going off immediately run to fetch it; but 'tis not adjudged so good, for the *Piece* should not be the Warning to him, but your *Command*; and if you give him this Liberty at your *Shooting*, when you come amongst your *Nets*, or *Lime-Rods*, as soon as he feels the *Fowl* entangled, and to flutter their *Wings*, he will presently rush in amongst them, which will occasion the spoyling your *Lime-Rods*, and the tearing or entangling your *Nets*.

The *Spaniel* is of great use in *Moulting-time*, that is, when the *Wild fowl* cast their *Feathers*, and can't fly, but lye lurking about in Secret places; which Season is between *Summer* and *Autumn*, at which time take your *Dog* into such places where they resort, causing him to hunt about, and when he finds them they are easily taken, by reason they can't fly. In *Fenny Countries* (where *Fowl* do much resort) great quantities may be so taken, driving them into places where you must have *Nets* ready fixed, as in Narrow *Creeks*, or the like. These *Fowl*, if taken and kept tame, and fed with *Beast-Livers*, *Whey*, *Curds*, *Bran*, *Pail*, *Scald-Bran*, and the like, are excellent *Food*, far surpassing those absolutely Wild, both for plumpness and fatness of *Body*, as also for sweetness of *Tast*.

There are divers other things that your *Water-Spaniels* are and may be taught, as taking off *Cases Hat*, shutting of a *Door*, and the like, all which I forbear as things not absolutely necessary for our purpose, and chiefly to please the Fancy.

CHAP. XXXIII.

Of the Setting-Dog, *with Rules to choose one, and to Train him up from a* Whelp, *to come to Perfection.*

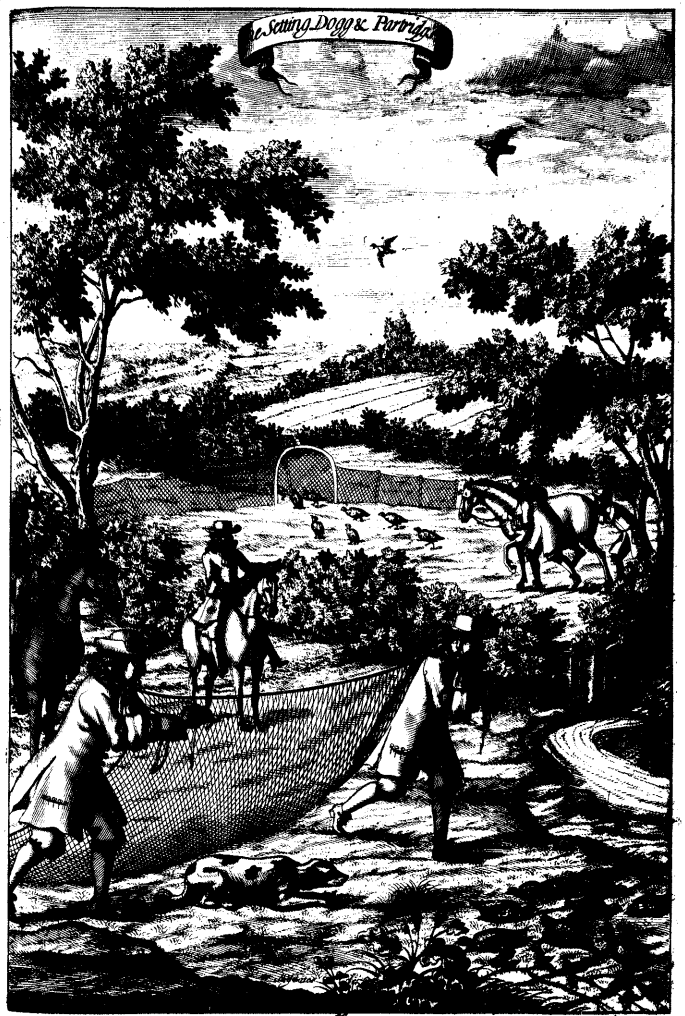
OF all sorts of *Dogs* there is none so fit and proper to be made a *Setting Dog*, as a *Land Spaniel*, by reason of their Natural Inclination to Ranging and Beating about a *Field*; But any *Dog* whether a *Water Spaniel*, or a *Mungril* betwixt both, or indeed a *Lurcher* or *Tumbler*, or any *Dog* that hath a perfect good Scent, and naturally addicted to the Hunting of *Fowl*, may be brought to be a *Setter*.

You should choose one of a good and nimble size, rather small than large and corpulent, of a high Mettle, and free for the Sport, being a nimble *Ranger*, of Active *Feet*, wanton *Stern*, busy *Nostrils*, and quick *Scent*, that his Toil be without weariness, his search without changableness, and yet that no delight or desire of the *Game* Transport him beyond Fear or Obedience; for it is the best Sign of a good *Spaniel*, never to be fearful, but always loving to his *Master*, yet of a bold Courage.

Some are so curious in observing the *Colours*, but that I Judge a vain thing, for all Colours are alike, if the natural qualities be perfect and answerable to your design. But those aforesaid properties can't be known whilst they are young, therefore your great care is to make choise from a good and right Breed; and having so done, you may begin to teach him at five or six Months old, as being then very Tractable, for the elder they are the more stuborn to learn, nor will they retain their Learning so well.

The first thing is to teach him to be loving and familiar to you above all others, taking his only delight in your Company; and the better to effect it, let none feed him but your self, for by this means he will not only be loving and fond, but obedient and careful of your Displeasure, a Frown or a sharp word making the same effect as Blows, for beating takes off their Courage, and makes them dull and dead Spirited.

Your *Whelp* being thus brought to the knowledge of you, and to follow you in a *Line* without any Reluctancy; your next business is to teach him to couch and lye close to the Ground, first, by laying him down, saying, *lye close*, *lye close*, or the like words of Command; and terrifying him with rough words when he doth any thing contrary to your desire, giving him not only good words and cherishing, but *Food* when he obeys your Commands; and by this means you will bring him to such Obedience, and perfect Understanding, that when at any time you shall say



To the Worshipfull Sr John Shelley of Michelgrove in Sussex Baronet This Plate is humbly Dedicated by his most Obedient Servant Richard Blome

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ſly *lye cloſe*, *down*, or the like, he will do it at a word, without any awkerdneſs.

Then about a Yard diſtance lay down a piece of *Bread* or *Meat*, crying *go near*, making him creep to it, but before he comes to it ſpeak ſmartly to him, biding him *lye down*, *take heed*, or the like, which obeying, give him your Commands by crying *Hey*, or the like words, to ſignifie him to creep forwards to it, and let him eat it, making much of him; and be careful not to be too ſevere in your ſharp *Words* or *Corrections* (eſpecially at firſt) for that may ſpoil him; and being thus at command to *Couch down* at your word, and always with his Head from you, make him creep forward by ſaying *go near*, *go near*, or the like; and if he offers to raiſe up his *Head* or any part of his *Body*, forthwith thruſt it down to the Ground, ſaying *down*, *down*, or the like; and if that will not do, correct him gently with a *Whip*, or by biting his *Ear*, for by no means beat him about his *Head*, for that makes him dull, and will ſpoil him; and be ſure when you thus Chaſtiſe him, have him always in a *String* (as indeed at all times during his making) that he may not run from you; and this Method obſerve until he is very expert, *Couching* at your Command, creeping on his *Belly* as far as you pleaſe, and lying ſtill until you give him your Command to riſe; ſo that at any time when you walk abroad with him in the *Fields*, and wantonly he rangeth about, upon his firſt hearing your Commands to *lye down*, he *Coucheth down*, and ſo lyeth till your further Commands.

Having brought him to this Obedience and Knowledge, then take him into the *Field* to Range about, ſuffering him to Spring any *Bird* or *Game*, not correcting him at the firſt, which will encourage him the better, and thus do for about a *Week*, exerciſing him daily; and when he hath been uſed three or four times to Spring *Partridges*, he will not follow any other ſmall *Bird*, ſticking only to them.

Take notice that you give not a *Bitch* that correction as a *Dog*, for ſhe will not endure ſo much; and what a *Dog* learneth one Day, he will retein it, but a *Bitch* is apt to forget, ſo that ſhe muſt have the oftner teaching.

If you can get a *Spaniel* that hath been accuſtomed to the *Hawk* (although a year and a half old) he will be ſooner made; for then there will be no need to give him the liberty of Springing without checking; for they will mind no other *Game* but the *Partridge*.

Having brought him to know his *Game*, and that he is ſo *Staunch*, as to *Hunt* cloſe and warily without *queſting* or opening, provide a *Bullocks Liver* boyled, (which hath the ſame Scent of the *Partridge*.) Then take your *Dog* in a *Line*, which muſt be about 15 Yards long to lengthen out on occaſion; and take in your *Hawking Bag* a good piece of the *Liver*, about the bigneſs of a penny Loaf cut into ſmall pieces, and lead him into the Field, and as you are going (your *Dog* being by your ſide or following you, for he muſt not go before you) give him your Commands to fall down as aforeſaid; and if he doth it not, correct him, rewarding him with ſome of the *Liver* if he obſerves your Commands; then go a little further commanding him down again, ſaying *down*, and thus do until he will *Couch* at the firſt word; and being brought to this command, turn your face to him, and take the *Line* by which he is led, gently pulling him by it crying *down*, *down*, ſo that he will not riſe without pulling almoſt by force; then go to him, take him up in your *Arms*, and carry him two or three *Yards*, then ſet him down making much of him, but not letting him go out of the *Line* from you. When he is at this command by often uſing this way, teach him to Hunt by hand, which is thus done. Take a piece of the *Liver* about the bigneſs of a *Walnut*, which ſhewing him in your Hand, and letting him ſmell to it, caſt it down which way you pleaſe, but at a ſmall Diſtance at firſt, ſaying *hey*, *hey*, ſhewing it him ſeveral times before you caſt it forth; then let him go to it, and eat it, ſtill having him in the *Line*. Then take another piece of the *Liver*, ſhewing it him as aforeſaid; and caſt it from you a little further than at the firſt time, and permit him to go to it, and eat it for his *Reward*. Thus do ſeveral times ſtill caſting it further and further; and as he is going you may give him your Commands, crying haſtily *Down*, *Down*, ſo that he immediately falls down with his face towards the *Liver*, and lye cloſe till you give him your Commands to riſe, by crying *Hey*, and pointing with your Hand for him to go forward to the *Liver*, and ſo ſuffer him to eat it; then call him to you, and make much of him.

The reaſon of teaching him thus to *Hunt* with the *Liver*, is to bring him not only to the Scent of the *Partridge*, and to be at command, to lye *down*, and the like, but alſo to obſerve your Motion which way you caſt it, that thereby when he is beating about the *Field*, upon your crying *Hey* to him; and moving your Hand he may know by the Motion thereof which way to *Hunt*, either to the right or left. And he muſt be very expert in this, before you ſuffer him to Hunt looſe, for he can't be at too much command.

Being thus expert at this, and alſo at great command, when he is Hunting at about fifteen yards diſtance, which is the length of the *Line*, on a ſuddain cry *Down*, then go round him at a ſmall Diſtance at firſt, taking the Circuit larger and larger, crying *Down*, that he ſtir not (which he may be apt to do being at ſome Diſtance from you, as thinking that he ſhould follow you) and then giving him a jerk with the *Line* crying *Down*, by which he will know that he muſt not ſtir.

Being thus uſed and that he is expert therein, and at command let him *Hunt* at liberty, but with the *Line* hanging at length dragging after him; and as he is thus *Hunting* looſe, on a ſuddain give him your commands to *lye Down*, and Peg the end of the *Line* to the Ground to hinder his runing away; then pitch down your *Staff* or *Pole*, to which faſten your *Line* of the *Net* at ſome Diſtance from him, and having the other end of the *Net* in your Hand, gently draw the *Net* over him as he lieth; and if he offers to ſtir at your doing it, rebuke him, making him lye cloſe, ſaying *Down*, *Down*, and ſo draw it over

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him backwards and forwards, that when you shall come to draw the *Net* over him when he sitteth *Partridges*, he will not be afraid, knowing what he is to do. And the Reason of the fastning the *Line* to the Ground that he is lead in, is to keep him from runing away at the first, if in case the drawing over the *Net* should frighten him, as at first is usual.

When he is thus made perfect, and that he endures to have the *Net* drawn over him without stiring, and that he is come to a good *Scent* to know the *Partridge* from the *Lark*, or any other *Game*, be provided with a Brace, or *Leesh* of five *Partridges*, which carry into the *Field*, and having *Strings* to their *Legs*, peg them down to the Ground, which should be done over night, to the end he may not know they were there placed by you; and for your mark of direction to know where they are when you come to Hunt with him, place up a *Bough* near them, to the end that when by beating about the *Field* he comes near then, that is, at about Ten or Twelves Yards distance having his *Line* dragging after him, and gaining the Point to be under the Wind of them, give him your Command to lie down; then round your *Dog* Five, Six, or Seven times, to find where they are, as also that he may know his Duty; then come up to him, and peg the End of the *Line* down to the Ground, that when you have drawn the *Net* over the *Partridges* he may not rise at their Fluttering, as they will do. Then set a *Pole* or *Staff* on the side of the *Partridges* at a reasonable distance, to which fix the *Line*, and gently draw it over your *Dog*, and let it lie Spread all over. And fearing that your first *Net* will not be sufficient to spread over the *Partridges*, be provided with another, the End of which tie to your *Staff*, and draw down the Wind towards the *Game*, so that both *Nets* may meet, which will spread over a good quantity of Ground. Then make into your *Nets*, take the *Partridges*, and make up your *Nets*, all which time cause him to lie close, without stiring, and having so done, go to him, and *reward* him with one of the *Necks* of the *Partridges*, permitting him to take their *Blood*. And if you chance to miss, however *reward* him with some of the *Liver*, as aforesaid.

After this method do several times, by which means when he comes to know the Scent of the *Partridge*, he will know how to set a *Covey*, and you will also know at what distance he sits, for the laying over the *Nets*.

Note, that when you correct your *Dog*, always have him in a *Line* that he may not run away, and also lead him some distance after his correction. Also always when you go into the *Field*, and when you come out, lead him in a *Line*, until he is perfectly made. And Note, that the best time to enter your *Dog* (provided he knows his *Game*) is in *Paring time*, for then you will find more *Game*, (that is, more *Pares*) than before you can *Coveys*; and also at that time the *Partridges* will lie more close, and not be so apt to spring, which is a great Encouragement to your *Dog*. Also Note, that you never let your *Dog Hunt* too long in hot *Weather* without *Water*, for that brings them to the *Falling-Sickness*, which *French Dogs* are more subject unto than *English*.

When you have brought your *Dog* to this staunch and obedient Hunting, and that you find him come upon the Haunt of any *Partridge*, which you shall know by his great eagerness in *Hunting*, as also by *Wagging* his *Stern*; then speake to him, saying *Take heed, Ware, Down*, or the like, to keep him from springing them; but if either he rusheth in, or *Quest* so that he springs them, take him up and correct him well, keeping him some time after in his *Line* that you may not discourage him; then cast him off again to Hunt in some other Haunt where you think to find a *Covey*, and as before give him warning, and if you see that he makes a Point, give him your Commands to sall, and taking *Range* about him, look if you can find them, and if he hath set them at too great a distance, give him your Commands to creep nearer, saying, *go nearer, go nearer*, making him creep upon his *Belly* towards them, until you think he is near enough; then make him lie close without stiring, and draw over the *Net* or *Nets* as before directed, and be sure to *cherish* and *reward* him well as aforesaid.

But if it so happen that he spring them through his rudeness, or want of care, then correct him severely, and take him up in your *Line*, lead him Home, tying him up for that Night, without giving him one bit of Food, and the next Day take him to the field in your string, and cast him off to Hunt about, as before directed, giving him harsh Words, to the end he may call to mind his former Fault, and be sensible of your displeasure, which will make him the more careful to obey your Commands, and if he doth well *cherish* and *reward* him, which will much encourage him.

Some *Dogs* will stand up in their *Setting*, which is a great Fault, so that they must be brought from it. Also 'tis a gross Fault for them to rush in after them, when you go to spring them into your *Nets*; therefore be sure he is in such Command as not to stir until you have taken them up, as aforesaid.

There is one more material thing to be observed, and that is to know the nature of your *Dog*, how he sets the *Partridges*, whether at hand, or at a distance; for thereby you must be guided to draw over the *Nets*, otherwise you may Spring them and no Fault of the *Dogs*.

CHAP. XXXIV.

An Abstract of certain Statute-Laws in Force, relating to Fowling.

NOne shall take *Pheasants*, or *Partridges* with *Engines* in another Mans Ground, without Licence, on pain of forfeiting 10 *s.* to be divided

vided betwixt the Owner of the *Ground*, and the Prosecutor. 11 *Hen.7. Chap.17.*

None shall destroy, or take away the *Eggs* of any *Wild-fowl*, upon Forfeiture for every one of a *Crane* or *Bustard*, 20 *d.* of a *Hern* or *Bittern*, 8 *d.* and of a *Duck*, *Teal*, or other *Wild-fowl*, 1 *d.* to be divided betwixt the *King* and the *Prosecutor*. *Stat.25 Hen.8.Chap.11.*

None shall kill or take any *Pheasants* or *Partridges*, with any *Net* or *Engine* in the Night Season, upon Forfeiting 20 *s.* for every *Pheasant*, and 10 *s.* for every *Partridge*; and upon Non-payment of the said *Fine*, within ten Days, then to suffer a Months *Imprisonment* without Bail, and to enter into Bond with good Sureties for two Years, before a *Justice* of the *Peace*, not offend in the like kind.

Every Person convicted by his own Confession, or by the Oaths of two *Witnesses*, before two or more *Justices* of the *Peace*, to have killed or taken any *Pheasant*, *Partridge*, *Pigeon*, or other *Game*; or to have taken or destroyed the *Eggs* of *Pheasants*, *Partridges*, or *Swans*, shall be committed to Prison without Bail, except he forthwith pay to the use of the *Poor* where the Offence was committed, or where he was Apprehended, 20 *s.* for every *Fowl*, or *Egg*, so killed, taken, or destroyed; and after one Months Imprisonment, shall be bound with two sufficient Sureties in 20 *l.* a piece, not to offend in the like case.

2. Every Person so Convicted to keep a *Greyhound*, *Dog*, or *Net*; to kill or take *Deer*, *Hares*, *Pheasants*, or *Partridges* (unless he have 10 *l. per Annum* Estate, a Lease for Life of 30 *l. per Annum*, or be worth in Goods 200 *l.* or be the Son of a *Noble Man*, or *Knight*, or Heir to an *Esquire*) shall suffer *Imprisonment*, as aforesaid; or pay to the use of the *Poor* 40 *s.* for such Offence, as aforesaid.

3. None shall Sell, or Buy to Sell again, any *Pheasant*, or *Partridge* (except by them reared up, or brought from Beyond Sea) on Forfeiture for every *Pheasant* 20 *s.* and for every *Partridge* 10 *s.* to be divided betwixt the *Prosecutor*, and the *Poor* of the Parish where such Offence is committed. *Stat.1. Jacobi Cap.27.*

Every Person convicted by his own Confession, or by the Oaths of two *Witnesses*, before two or more *Justices* of the *Peace*, to have *Hawked*, or destroyed any *Pheasant* or *Partridge*, betwixt the first of *July* and the last of *August*, shall suffer one Months *Imprisonment* without Bail, or pay to the use of the *Poor* where the Offence was committed, or where he was Apprehended, 40 *s.* for every time so *Hawking*, and 20 *s.* for every *Pheasant* or *Partridge* so taken or destroyed; but this Offence shall be Prosecuted within six *Months* after the Offence committed.

II. It shall be lawful for every *Lord* of a Mannor, or having *Free Warren*, Inheritance of 40 *l. per Annum*, *Free-hold* of 80 *l. per Annum*, or *Goods* worth 400 *l.* or their *Servants* Licensed by them, to take *Pheasants* or *Partridges* within their own *Grounds* or *Precincts*; Provided they do it in the Day time, and only betwixt *Michaelmass* and *Christmas*.

III. If any Person of a Mean Condition be Convicted by his own Confession, or by one *Witness* upon Oath, before two or more *Justices* of the *Peace*, to have killed or taken any *Pheasant* or *Partridge* with *Dogs*, *Nets*, or *Engines*, shall be committed to *Prison* without Bail, unless he pay to the use of the *Poor*, as aforesaid, 20 *s.* for every *Pheasant* or *Partridge* so killed or taken, and also become bound in a Recognizance of 20 *l.* never to commit the said Offence.

IV. Every *Constable*, or *Headborough*, upon Warrant under the Hand and Seal of two *Justices* of the *Peace*, hath power to search the *Houses* of Suspected Persons to keep any *Setting Dogs*, or *Nets*, for the Taking of *Pheasants* or *Partridges*, and *Nets* there found, to kill and cut in pieces at pleasure, as things Forfeited to the said Officer.

The

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FISHING, & ANGLING.

To the Rt. Worshipfull Sr. William Drake of Amersham in Buckinghamshire Knight

This plate is humbly Dedicated by Ric. Blome

Fishing, weates of ye severall sorts of Fish, & how to take them, by

Angling, wherein is to be considered

ye Chosing, making, & ordering of

Rodds,
Hooks,
Lines,
Corks,
Floats,
Plumets,
Baites,

According to ye nature, & busines of ye fish, designed to take.

Naturall,
Artificiall,

for ye takeing of all fish, according to ye Season of ye year, & weather.

liveing, & dead.

Season of ye weather.

time of ye day, & year.

divers Cautions to be observed in Angling, according to ye

ye natures & qualityes of each sort of fish shewing

in what water & Coyler, they delight.

how to take them by day, & night,

how to take, & preserve worms, & frogs, usefull for Baites.

Day,
Night,
with fire, & without.

Netts, wth directions to use them by

a Spear or darting Rod.

Day.
Night.

Weeles, by

Running knotts of horse-haire.

directions for preserveing Fish in Ponds, & Rivers, from otters, Water Rats, Kerns, Coots, Sea pies, & other deyouring Creatures, with Instructions for ye makeing, ordering, & storeing of ponds. To know a breeding Pond, from a Growing Pond, Also how to order & feed Fish, & what Fish agree best together.

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To the Rt noble Christopher Duke of Albemarle, Earle of Torington, Baron Monke of Potheridge, beauchamp and Teys, Kt of the Garter, Captaine of his Mats life Guard, Lt Leiutenant of Essex and Devonshire, one of the Gentlemen of his Mats Bedchamber, and one of the Lord of his most Honourable Privy Councell &c.

This Plate of Fishing is most humbly Dedicated by Ric Blome.

FISHING.

PART V.

The *Rules* for *Angling*, as the choosing of *Rods*, *Hooks*, *Lines*, *Corks*, *Floats*, *&c.* with Directions for the taking all sorts of *Fish*, and the making of *Baits* proper for them, according to the Season of the *Year* and *Weather*. Also *Instructions* for the taking *Fish*, with several sorts of *Nets*, *&c.* Directions for preserving *Fish* in *Rivers* and *Ponds*, together with many Secrets and Curiosities relating to the said *Art*.

CHAP. I.

The Introduction.

IT will not be necessary to trouble the *Reader* with long *Encomium's* on this Delightful *Art* of *Fishing*, but only repeat the words of a Worthy and Ingenious *Gentleman* that was a great proficient herein, who often used to say, That after his Study, it was a rest to his Mind, a chearer of his Spirits, a calmer of unquiet thoughts, a Diverter of Melancholy, a procurer of Contentedness and Patience, and a Moderator of Passions.

He that will be his Arts Master in this Innocent Recreation, must not only be experienced in the several *Tackling*, as the *Rod*, *Line*, *Hooks*, *&c.* But also must understand the Nature and Properties of each *Fish*, the proper *Baits* to take them according to the Season of the *Year* and *Weather*. And the better to embolden him to a progress herein, he must be endowed with Hope and Patience. The first thing that I shall Treat of shall be the *Rod*.

CHAP. II.

Directions touching the choise of a Rod.

YOur *Rod* ought to be either of one entire piece, of two pieces, or of several *Joynts*; the former without doubt is the best, *Art* being but a Mimick of Nature; for in the Composing and Framing *Artificial Rods*, we do but imitate the Natural Ones, and think we have come nearest the Mark, when we have wall Counterfeited them: But it is the Opinion of an expert *Angler*, that *Rods* of two *Joynts* are the best; for that no shoot of any sort of Wood grows so exquisitely taper, as to make a *Rod* of fourteen *Foot* long, (which is the usual Length). And if by great chance you should get one, the Peth of such a quick growing *Wood*, would cause the top to be brittle; and if of hard *Wood*, it would then be top heavy; for the true *Art* of making a *Rod* is of a *Rush Taper*, which must Spring equally in all parts, for being stiff in the one and weak in the other, doth oft occasion the losing the *Fish*.

The *Red Sallow*, or *Withe*, and the *Ground Hazel*, streight and well grown taper-like from the bottom to the top, are of all others the most esteemed as being the toughest and lightest; and yet strong enough to hold the biggest *Fish*. They should

should be gathered in the fall of the Leaf, when the Sap is in the Roots, for after *January* it ascends into the *Trunk* and *Branches*, and then they are not good. Let them be the best *Rush-ground Shoots* you can get, not knotty, but proportionable streight and Slender; the *Boughs* and excrescent *Twigs* should be presently cut off, but not close, for fear of cutting any of the *Bark*, which is not only an *Eyesore*, but a weakning to it.

Having thus prepared your *Rods*, lay them on a flat *Floor* with a good weight on them, to keep them from warping; but contrary wise some hang them against the *Wall* of a Room on small Tacks, with the great ends downwards, which is held the best way, and about *February* you may pare off the knots close; and when they are well seasoned and fitted to your liking, fix on the Loops of *Silk* or *Hair* at the small ends; but by the way note, that they are not fully seasoned till about a Year and a half; and if they were kept two Years, they would be the better.

For preserving of these *Rods* or Tops from rotting, or Worm eating, 'tis good to rub them over twice or thrice a year with *Sallet* or *Linseed Oyl*, or with *Sweet Butter* that hath no Salt in it, chasing it well in; and if the *Stocks* or *Tops* of your *Rods* cast with lying, *Bath* them, and set them in a gentle Straw Fire, which will bring them right again.

Rods may be Distinguished into four Sorts, *viz.* the *Trowling Rod*, the *Snaping Pole*, the *Angling Rod*, and the *Fly Rod*.

The *Trowling Rod* is the largest, at the top of which is put a short piece of Wood, about six *Inches* long, with a strong Wire Ring to guide your *Trowling Line*.

The *Snaping Pole* ought to be so strong and large, as the *Angler* can well Manage, and to be of a Tough, and well grown *Taper Pole* of one piece, and such that will bear a *Fish* of about ten or twelve pound weight, to throw out of the Water.

The *Angle Rod* ought to be of two, or more *Joynts* of *Cane*, or *Wood* as aforesaid.

The *Fly Rod* must be small, curiously Taper, and light to be managed with one Hand.

In a word, the great *Art* of making *Rods* is, that they be curiously Taper, and in all parts of a quick Spring proportionable; for if it is not in all parts of an equal Spring, you will seldom strike sure, and by consequence endanger the losing the *Fish*.

The top *Rods* being short, are to be joyned to *Stocks*, *Art* having supplyed the Defect of Nature. Your *Stocks* may be either of a good ground *Ash*, or *Witch-hafel* about nine or ten *Foot* long, gathered as aforesaid; and be sure it come not to the Fire until the *Spring*, then if you find it well Seasoned, fet it exactly, otherwise allow longer time. Take not off the outward *Rind*, and either by its own Nature, or your *Art* get it to be of a good brown Colour, so that it make no Reflection in the Water; if you mix a little *Capons Grease* with *Spanish Brown*, and rub the *Rod* over therewith before a gentle Fire, you will quickly bring it to its right hue. In the small end of the *Stock*, bore a *Hole* with a *Taper bit*, about four *Inches* deep, and of a convenient size to receive the biggest end of the *Top Rod*, and have it Ferretted; and the reason of doing it so, is to preserve the Stock from Splitting where the Hole is made. Your *Top Rod* should be about a yard and a half long, with the upper rind preserved intirely about it, and the top though pliant, yet must be so strong to endure the jerk of a *Trout* or *Carp*.

At the small end fasten the Loop either of *Silk*, or *Hair*, wherein to place the *Line*, but of all Tops questionless the *Whalebone* is the best, being plyant and strong.

The largest *Joynt* which is the outward *Joynt*, and carrieth all the rest as in a case, ought to be either a *Female Bambu Cane*, or else a red *Sallow*, these being the freest from warping, and a piece seven or eight *Foot* long will carry longer and better Taper *Joynts* than a piece of the same sort ten *Foot* long; and for the inward *Joynts Hasel* is the best, which *Joynt* or *Joynts* must be in length proportionable to the size of the outward *Joynt*, both to length, and to make it exactly a Rush *Taper*.

If your *Rod* be of many pieces, they are then of *Canes* or *Hasel*, exactly bored through to receive each other, the ends being neatly hooped about with *Sockets* of Brass or Silver, as before taken notice of. And thus may you carry a *Rod* of fifteen or sixteen *Foot* long, like a walking Staff; but these being bought at the Shops of those that sell Fishing Tackle, and at such easy Rates, I shall say no more, advising you rather to buy them, than to be at the trouble to make them.

CHAP. III.

Of Lines, *for the making, colouring, and preparing them.*

For your *Lines* they are either all *Hair*, all *Silk*, or mixt with both; but *Lines* of all *Silk* (though handsom) are very inconvenient, because of their Twisting; so are *Lines* of *Hair* and *Silk*. Therefore make use of *Lines* of all *Hair*, for all sorts of *Angling*, which must be Tapervise; so that near the *Hook* they may be of one or three *Hairs*. Next to *Lines* all of *Hair*, are those made of *Raw Ardas Silk* neatly Twisted, which in the Opinion of many are excellent, for these are far stronger and finer than *Hair*, and will not rot or twist in the Water, or else where. And for the *Trowling* or *Snaping Lines*, let them also be made of *Raw Ardas Silk*, worked with *Bobbins*, being far stronger than the coloured *Silk Lines*, and much smaller, and freer from Twisting.

Let all your *Hair*, as near as you can, be of an equal Bigness, and if you lay them about a quarter of an Hour in *Water*, you will find which of the *Hairs* do shrink, and such are not good. The best *Hairs* are plucked from the innermost middle of the *Tayl* of a *White*, or *Grey Stone-Horse*.

When you make a *Line* of Three *Hairs*, add one Thread of *Silk*, which is sufficient; if you make *Lines* of Five *Hairs*, add Two Threads of *Silk*, and if of Seven, then Three of *Silk*; this latter will be sufficient for the *Chub*, *Barbel*, *Pike*, nay *Salmon*; the second for the *Carp*, *Trout*, *Greyling*, &c. and the first for the *Gudgeon*, *Roach*, *Bleak*, &c.

In twisting your *Hair*, great care must be used that they be exactly done, without *Gaping* and *Snarles*, and that they be strong tied at the ends with the *Fishers Knots*, which is folded Four times about, under and above. You must in drawing this Knot temper your *Hair* with some *Water*, or *Spittle*, for that will make it hold. For the length of your *Lines* they must be proportioned to the place, and the *Fish* you design to take, and your own discretion must be your guide.

For the *Colour* of your *Lines*, they should as near as possible imitate the *Colour* of the *Water*, so that if your *Hair* be White, let your *Silk* be Green, for that mixture draws to a light Gray. If it be in a Muddy Stream, the *Silk* had best be of a drak *Ash-Colour*; But for your exact *Water Green*, Take a quart of small *Ale*, and boyl therein half a pound of *Alom* until it be dissolved, then put in the *Hair*, and let it boyl half an hour; then take it out, and let it dry in the Shade a Night and a Day; then take Two Handfuls of *Elder* and boyl it half an hour in a Pottle of *Water*, until you see a Yellow Scum rise, then put in your *Hair* with about half a pound of beaten *Copperice*, or instead thereof, the like quantity of *Verdigrease*, or a quarter of a pound of each, and let the *Water* boyl about half an hour more; then take it off, and let your *Hair* lye therein four or five hours infusing, and you will have an excellent *Green*. To make your *Hair Yellow*, steep it in *Water* wherein you have either boyled, or bruised two or three handfuls of *Green Walnut Leaves*. To make your *Hair Russet*, take a Pint of strong *Lye*, half a pound of *Soot*, and two spoonfuls of the Juice of *Walnut Leaves*, and when they are well boyled together, take it off the *Fire*, let it cool, and put therein the *Hair*, and let it continue until it be dyed enough; To make it darker put some *Umber* into the Liquor. If you would have the *Hair Tawny*, bind it close up at both ends, and steep it in *Tanners Ouz* until it be according to your liking; and if you did first steep the *Hair* in a little *Lime-Water*, it would take the *Tawny Colour* the better.

You must die your *Hair* before you make it up into *Lines*, for then you may mix it as you see cause. The *Green Hair* is good from *March* to *September*; from thence to *December* the *Tellow*, and from thence to *Easter* the darkest Colours.

At each end of your *Line* make a *Loop*, the one for your *Rod-Loop*, and the other for your *Hook*.

CHAP. IV.

Instructions relating to Corks, Flotes, &c.

Touching your *Flotes* order them in this manner; Take the closest *Cork* you can get, and with a sharp *Knife* pare it very smooth about, which for size and form is left to your Judgment, it being only to shew you when and how the *Fish* are at your *Bait*; the lesser it is so much the better in this respect that it will not frighten the *Fish* away, then with a hot *Iron* bore a Hole through it, and therewith put a *Goose-Quill* of a fit size for the *Cork*, which must be fitted with regard to the proportion of your *Line*, and that again to the strength and dimensions of the *Fish* you design to take with the *Line*, as before noted in the second *Chapter*. The small end of the *Cork* must be towards the *Hook*, the *Quill* must be pegged into the *Cork*, and so your *Line* into the *Quill*, which you may raise or let down as you see cause.

Your *Flotes* are made of *Muscovy-Duck Quills*, or *Swans-Quills* which are held the best for Still *Water*; but the flat and round *Flotes* are esteemed the best.

When your *Cork* is gently drawn under *Water* then strike and not with too smart a Jerk, but only to fasten your *Hook*, and then draw with an even touch according as you see cause. If your *Tackling* be strong, and your *Fish* large, you may be the bolder; but to go securely to work, never let the *Fish* feel the strength of the *Line*, left he Snap it off; but hold him gently under the *Rod*, and let him tire out himself, which he will soon do by Eight, or Ten Plunges, and then you may draw him gently towards you; if you be too hasty you are not a good *Fisher*, for this Recreation requires great Patience, Industry, and Vigilance.

CHAP. V.

Rules for the Chusing, making and fixing your Hooks, Plumets, and for sounding the depths of Water.

As for your *Hooks* chuse them in proportion according to the size of the *Fish*, you intend to Catch; Therefore as for the making them follow these directions. Take either Old *Spanish Needles*, or strong *Wier*, drawn to the same height of temper, that being nealed and laid in the *Fire* you may bend at pleasure. If you make them of *Needles*, it is but holding them in the *Fire*

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or in the Blaze of a *Candle*, until they be Red-hot; then let them cool, and you may turn them into what Form you pleaſe; but for *Wyer* you muſt uſe a *Charcoal-Fire*, and turn it up and down until it be Red-hot, then let it cool, and ſo work it. Firſt, *File* out the Point of the *Hook*, which muſt be neither too ſharp, nor too dull; for the one will be too quick to catch every thing, and the other will hit nothing: let it be therefore ſharper than a *Pin*, and ſomewhat duller than a *Needle*; then with a ſharp *Knife* raiſe up the *Barb*, or *Beard*, wherein be careful not to weaken the ſtrength of the *Hook* too much; then with a Pair of *Plyars* form your *Hook* rounder than a Semicircle, and let the *Bow* come in enough, ſo as to be *hooked*; for it is that which chiefly holds the *Fiſh*, and not the *Barb*, as by Experience hath been often found; for the Taperer all *Hooks* are filed, the ſtronger they are to hold a *Fiſh*.

The *Shank* of your *Hook* ſhould be of a moderate length, a little flatter towards the End, and knobbed, for the better faſtning it to your *Warp* of *Hair*, or *Line*. You muſt then Poliſh it all over, heat it Red-hot in a Pan of *Charcoals*, put it ſuddenly into the *Water*, and that will bring it to its true ſtrength and hardneſs.

By this Direction you may likewiſe Form your double *Hooks*, which are two *Hooks* made of one *Wyer*, joyned Back to Back, and turned the contrary way from each other, with a ſtrong *Wyer* to the *Stem*, or *Shank*, about three or four Inches long, and a Link fixed thereto with fine ſmall *Wyre*, and unto this laſt *Link* faſten your *Line*, or elſe the Teeth of the *Pike* will ſoon ſhear it off.

For the faſtning your Length or Link of *Hair*, to the *Hook*, do thus: Lay it on the inſide of the *Shank*, and ſo whip it about with a ſmall *Silk-thread* well *Waxed*, and neatly done, without any Knot in the *Hair*, and faſten the Ends of the *Silk*, by drawing them under your *Bows* at the two or three laſt Turns; then cut off the Ends of the *Hairs* which you turned from the *Hook*, and it is no ordinary twitch which can ſeparate one from the other. On the other End of that *Link* of *Hairs* make a Loop, to faſten the remaining *Line* thereunto.

In caſe you *Plum* your *Line*, obſerve theſe Directions: Your *Plumets* muſt be of *Lead*, ſome bigger, ſome leſs, with relation to the proportions of the *Hook*, *Line*, *Cork*, &c. the End of the *Plumets* being to ſink down your *Hook* and *Line*, that it may lye either towards the Middle, or Bottom of the *Water*, as you deſign to Fiſh; but they muſt not be ſo heavy as to ſink the *Floats*. Your firſt *Plumet* may be about twelve *Inches* from the *Hook*, and the reſt about an *Inch* diſtant from each other: and of theſe you may uſe five, ſeven, nine, or as you ſee occaſion; for the form of the *Plumets* it is not material, provided they be ſmooth, for otherwiſe they will endanger the tangling of the *Line*, catching *filth*, or the like; yet ſome are of Opinion, that more than one *Plumet* is inconvenient.

To be exact in *Pluming* and *Corking*, you ſhould know to an *Inch* the depth of the *Water* where you Fiſh; for which purpoſe you muſt have a *Musket-Bullet* bored through with a double *Thread* tyed at it, which *Thread* being laid over your *Hook* you may therewith Sound the Bottom, and then *Plumb* and *Cork* accordingly.

That you may not incommode your *Tackle*, it will be requiſite to keep every Thing or Utenſil apart, and that you be provided with all your *Tackle* upon occaſion, as your *Bob* and *Palmer*, your *Hooks* of ſeveral ſizes; alſo your *Corks*, *Flies*, *Silk*, *Thread*, *Lead*, &c. each in its ſeveral Box; likewiſe your *Linnen* and *Woollen* Bags, for your ſeveral *Baits*; alſo a *Whetſtone*, to ſharpen your *Hooks*; and forget not to be provided with a ſmall *Pole* with a *Loop* at the End thereof, to which a ſmall *Net* may be faſtned for your Landing of great *Fiſh*; and be ſure let not your *Paunder* be too heavy, thoſe that are made of *Oſiers* are the beſt.

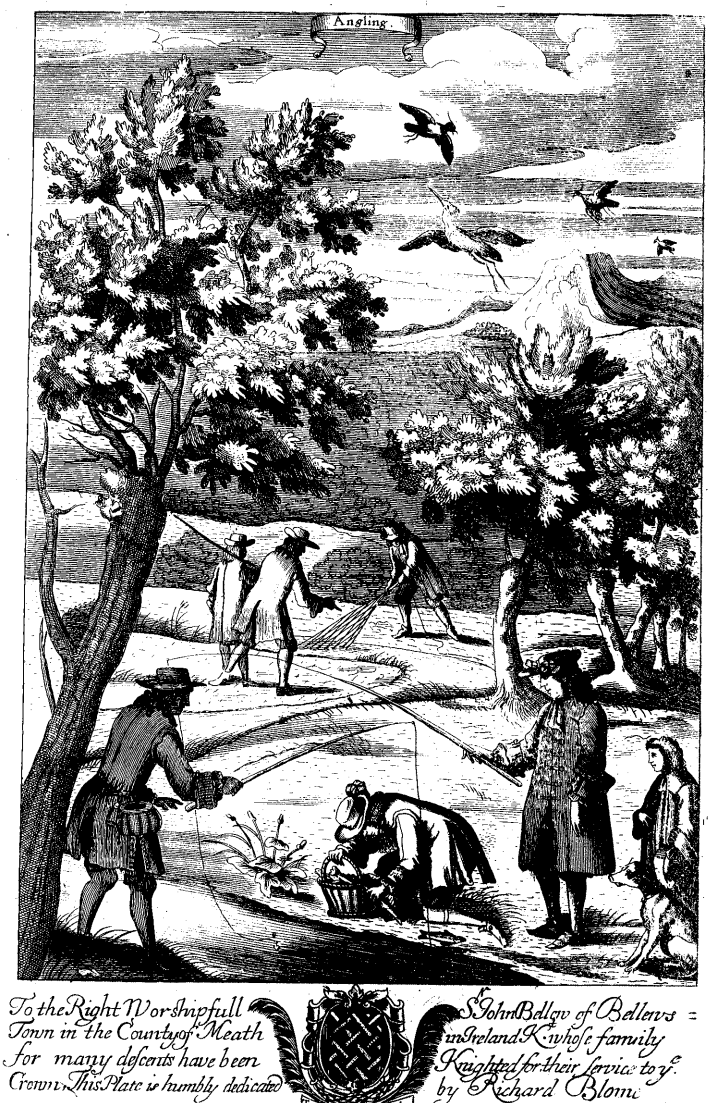
CHAP. VI.

Cautions to be obſerved in Angling, *as to the Seaſons of the Weather, the Time of the Day and Year, &c.*

IN *Angling* ſo place your ſelf that your Shadow do not at any time reſt on the *Water*; but in very deep *Waters* that is not ſo neceſſary to be obſerved, yet to be exact you ſhould uſe all the Advantages the place will afford.

In a *Pond* you ſhould *Angle* near the *Foard* where *Cattle* go to drink; and in *Rivers*, in thoſe places where ſuch ſorts of *Fiſh* that you intend to *Angle* for do uſually frequent, *viz.* the *Chub* in deep ſhaded Holes; *Roach* and *Pearch* in Scowrs; *Eels* under hanging over Banks; *Trouts* in quick Streams, and with a *Fly* upon the Stream on the Top of the Water; and for *Breams* in the deepeſt and quieteſt part of the *River*. And if in ſuch places where the Gravelly Bottom may be diſcerned, then be ſure to conceal your ſelf as much as poſſible. In *Waters* peſtered with *Weeds*, *Roots* of *Trees*, and ſuch like, *Fiſh* lye cloſe and warm, and reſort thither in great Shoals, there they will Bite freely; but take great care how to caſt in the *Hook*, and how to ſtrike a Bite, for the leaſt Raſhneſs loſeth *Hook* and *Line*. But in caſe your *Hook* be at any time entangled, you ſhould be provided with a *Ring* of *Lead* ſome ſix *Inches* about, which faſten to a ſmall long *Packthread*, and thruſt the *Ring* over your *Rod*, letting it go into the *Water*, and work it gently up and down with your *Packthread*, and it will ſoon diſengage your *Hook*.

It is good *Angling* in *Whirlpools*, under *Bridges*, at the Falls of *Mills*, and in any place where the Water is deep and clear, and not troubled with *Wind*, or *Weather*. The beſt Times are from *April*



To the Right Worſhipfull Sr John Bellew of Bellewstown in the County of Meath in Ireland Knt whoſe family for many deſcents have been Knighted for their ſervice to ye Crown. This Plate is humbly dedicated by Richard Blome

Tout Vient D'haut

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April to *October*, for in cold, ſtormy and windy Weather *Fiſh* will not Bite; and the beſt times of the *Day* are from Three to Nine in the Morning, and from Three in the Afternoon to *Sunſet*. If the *Wind* be *Eaſterly* 'tis in vain to go forth to *Angle*, any other of the Points are well enough, if it blow not hard; but the *South* is the beſt, and a cloſe, lowring warm Day, with a gentle Wind, and after a ſudden *Shower*, to diſturb the Water, at which time they will beſt riſe at the *Fly* and Bite eagerly, and therefore the moſt to be deſired by the *Angler*; and the cooler the Weather is in the hotteſt *Months* it is the better. In *Winter* all Weathers, and all Times are much alike, only the Warmeſt are the beſt.

It is very good *Angling* a little before the *Fiſh Spawn*, for then their *Bellies* being full, they frequent *Sandy Foards*, to rub and looſen their *Bellies*, at which time they will freely Bite.

After a clear *Moonſhine Night*, if the *Day* prove Dull and Cloudy 'tis very good *Angling*; for in ſuch Nights they are fearful to ſtir to get *food*, lying cloſe, ſo that being hungry the next Day will boldly and eagerly Bite.

At the opening of *Sluces*, or *Mill-Dams*, if you go with the Courſe of the *Water* you can hardly miſs of *Fiſh*, that ſwim up the Stream, to ſeek for what *food* the Water brings down with it.

In *Waters* that Ebb and Flow, 'tis beſt *Angling* at the Ebb; but if the *Tides* are not ſtrong, then the Flood is to be preferred.

At any time when you perceive the *Trouts* to Leap pleaſantly at the *Flies* above Water, or the *Pikes* to purſue other *Fiſh*, then it is a good time to *Angle*.

I have ſhewed the moſt proper *Seaſons* for *Angling*; there are other Times as improper, and ſuch are after great *Rains*, whilſt the Waters are violent and diſcoloured: In the extremity of *Heat*, when the Earth is parched with Drought, eſpecially in Muddy or clear Shallow *Rivers*: At the Fall of the *Leaf*; not ſoon after *Spawning* time, for then their Appetite is much abated; nor is it good to *Angle* near ſuch places where *Husbandmen* waſh their *Sheep*, for that kills all ſorts of Fiſh: To conclude, The Experienced *Angler* muſt obſerve the *Times*, *Seaſons*, and *Places*, otherwiſe his *Baits*, though never ſo good, will be but little effectual.

CHAP. VII.

Concerning the Natures of Fiſh, in what Waters and Soils they delight.

I Shall next deſcend to the particular Nature of *Fiſh*, and conſequently to the Rules to take them.

Carps, *Eels*, *Tench*, *Breams*, *Chevins*, and *Pikes*, delight moſt in ſtanding *Waters*, and ſtill *Pools*; the three former in Muddy Bottoms, the latter in Sandy. *Salmons*, *Trouts*, *Perch*, *Gudgeons*, *Barbels*, *Chubs*, *Roach*, and *Dace*, delight in Runing-Streams, the former in the Swifteſt and Deepeſt places thereof, the latter in ſtill *Pools* and Shady places of the ſame *Brooks* and *Waters*. The *Shad*, *Mullet*, and ſome others, delight in ſuch Waters as Ebb and Flow, provided the *Floods* be not exceeding *Salt*.

In this *Chapter* I have been very brief, by reaſon I intend to be more large when I ſpeak of each *Fiſh* in particular.

CHAP. VIII.

Concerning Baits Natural and Living, Artificial and Dead, &c. with Directions for the Making and Preparing them, &c.

THere are three ſorts of *Baits* for taking *Fiſh*; Firſt, the *Natural* ones, and thoſe are generally Living, as *Worms* of all kinds, eſpecially the Red, *Maggots*, *Bobs*, *Frogs*, *Graſhoppers*, *Bees*, *Beetles*, *Dors*, *Butterflies*, which are admirable for the *Chubs*; *Waſps*, *Hornets*, *Snails*, ſmall *Fiſh*, &c. Next, the *Artificial Baits*, and they are of two ſorts; firſt, ſuch as imitate the Living *Baits*, eſpecially *Flies*, for every *Month* and *Seaſon* in the Year, nay, almoſt for every Fiſh, ſo great is the variety of them that frequent the *Meadows* and *Rivers*. Theſe *Flies* are made on the Bodies of your *Hooks*, the Body of the *Fly* being made of *Wool*, and the Wings of ſeveral ſorts of *Feathers* coloured to the life, to reſemble thoſe you counterfeit; and with theſe you draw your *Hook* gently on Top of the *Water*, and generally againſt the Stream, and the Fiſh will Bite at them with ſuch greedineſs, that you can hardly miſs a Bite.

The ſecond ſort of *Artificial Baits* are *Paſtes*, which are made of ſeveral Compoſitions, as the young Brood of *Bees* and *Waſps*, clotted Blood of *Sheep*, *Cheeſe*, *Whitebread*, *Corn*, *Seeds*, *Bramble-Berries*, *Flowers*, &c. of all which I ſhall ſpeak more particularly in their due places, when I come to treat particularly of the ways of taking each ſort of Fiſh; however a word or two.

The *Red-Worm* is good for ſmall Fiſh the whole Year about, and ſmall *Fiſh* are good Baits for *Pikes* at all times; *Sheeps-Blood* and *Cheeſe* is a good Bait in *April*; the *Bob*, dryed *Waſps* and *Bees* are for *May*; *Brown-flies* are for *June*; *Maggots*, *Hornets*, *Waſps* and *Bees*, for *July*: *Snails* for *Auguſt*; *Graſhoppers* for *September*; *Corn*, *Bramble-Berries*, and *Seeds*, at the Fall of the *Leaf*: Your *Artificial Paſtes* are for *May*, *June*, and *July*; and *Frogs* are for *March*.

Now

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Now as concerning your *Artificial Flies*, The great *Dun-fly* will do well enough the latter end of *February*, if there be fair Weather, for 'tis a sign the *Air* is warm, and that the *Fish* begin to partake of the Suns Heat, so that in reason you may expect they will bite freely; The *little Dun-fly* is proper for *March*; The *Stone* or *May-fly* e is for *April*; The *Red* and *Yellow-fly* for *May*; The Black, Dark, Yellow, and *Moorish fly* for *June*; The *Wasp*, and *Shell-fly* e for *July*; and the Cloudy or *Blackish-fly* is for *August*. But generally *Fish* most eagerly rise at these *Flies*, at the Season when most sorts of *Flies* resort to the *Water* side.

The best way to make these *Flies*, is to get the living ones of the several kinds; and thereby to imitate Nature both for *Shape*, *Colour* and *Size*, for the nearer the better. Those *Fish* that Bite freest at *Flies* are *Chubs*, *Chevins*, *Trouts*, and *Salmons*.

The great *Dun-fly* e is thus made, let the Body be of *Black-woull*, and the *Wings* of the *Dun-feathers* of a *Drakes Tail*. The little *Dun-fly* e hath his Body made of *Dun woull*, and his *Wings* of the *Mayle* of a *Partridge*; these are for *March*. The Body of the *Stone* or *May-fly* e must be of *Black-woul*, but under his *Wings* and *Tail* give it a little tincture of a pale yellow, with some *Silk* of that colour, and his *Wings* must be of *Drakes Down*; this *Fly* is for *April*. The *Red*, or *Ruddy-fly* must have his Body made of *Reddish-woull*, capt about with black *Silk*, and the *Wings* mixt of the *Mayle* of a *Mallard*, and the red *Feathers* of a *Capons Tail*; this *Fly* is for *May*. The *Yellow* or *Greenish-fly* must have his Body made of *Black-woull*, with a *Yellow* List on either side, and the *Wings* of a *Red Cocks Mayle*. The *Moorish fly* hath his Body made of *Duskish-woull*, and the *Wings* of the blackish *Mayle* of a *Drake*. The *Tawny-fly* e must be made of *Tawny Woull*, the *Wings* made contrary one against the other, of the whitish *Mayle* of a *White Drake*; these *Flies* are for *June*. Th *Wasp-fly* is made of *Black-woull*, capt about with *Yellow Silk*; and the *Wings* of a *Buzzards Down*, or of a *Drakes Feathers*; this *Fly* is for *July*. The *Shell-fly* e Termed also the *Green-fly*, hath his Body made of *Greenish-woull*, and the *Wings* of the *Herle* of a *Peacocks Tail*; this is also for *July*. The *Cloudy Dark-fly* must be made after a different way, for it must be formed on a small piece of Cock, bound about with *Black-woull*, and *Black-silk*, and his *Wings* of the under *Mayle* of a *Mallard* with a black Head; when you draw it on your *Hook*, be sure no part of the *Hook* is discerned; this *Fly* is for *August*.

The rougher the Bodies of your *Flies* are, and the more shining, the better are they esteemed; and when you have got a Set of good exact *Flies*, they will serve you many Years, if carefully kept in a handsom Box free from bruising and crushing. Observe this for a Rule, that the highest *Flyes* are for cloudy and dark weather, and the darkest for the bright and clear Weather.

It is not amiss to lay down some Directions to be observed, for *Artificial Fly-Fishing*. First, observe to have the Wind in your Back, and in casting off your *Line*, be sure that the *Fly* fall first to the *Water*. For every sort of *Fly* have several of the same, differing in colour to suit with the several *Waters* and *Weathers*. In slow *Rivers*, or still places cast your *Line* as far as you can, and let it sink a little, then gently draw it back; and let the *Fly* float leasurely with the Current. When you *Angle* after *Rain*, and that the Water begins to become clear, use the *Red-fly* for dark *Waters*, keep not near the *Water* side, and *Fish* down Stream; and let not your *Line* touch the *Water*, but only the *Fly*. Your *Line* should be as long again as your *Rod*, unless the *River* be very shallow, and clogged up. You must have a nimble Hand, and a quick Eye to strike presently upon the rising of the *Fish*, otherwise the *Fish* will be apt to spew out the *Hook*, as finding his mistake.

I shall next proceed to *Live Baits*, which are to be kept each sort by themselves; and to be fed with such things as they use to eat, when at liberty.

The *Red-worm* delights much in black fat Earth; and if you mix therewith some *Fennel* small chopt, they will very much improve; and sometimes give them a little *Ox*, or *Cow Dung* newly made: They may be kept in some little *Box*, or *Box*.

But *Red-worms*, as also all other sort of *Worms* scour quick, grow very tuff and bright, by putting them into a thin Clout greased with *Fresh Butter*, or *Grease*, before you put them into *Moss*, which of all things is best to keep them in, and the *Moss* must be prepared by washing it very clean, and squeezing out the *Water*; and for the Feeding them, drop a spoonful of Cream into the *Moss* every three or four Days; and remove the *Moss* every week, keeping it in a cool place. And note that a Dead *Mans Skull* beaten to Powder for the Worms to scour in, is excellent.

White *great Magots* are to be fed with *Sheeps Tallow*, and *Beasts Livers* cut small.

Frogs and *Grashoppers* will do well in wet *Moss* and long *Grass*, which must be every Night moistned; when you use them cut off their *Legs*, and *Wings*.

The *Bob*, *Cadis-worm*, *Canker*, and such like are to be preserved with the same things where you take them.

Live-flyes must be used as you catch them.

The *Wasp*, *Hornet*, and *Humble-Bee* may be dryed in an Oven after the *Bread* is drawn, but be careful of scorching them, then dip their Heads in *Sheeps Blood*, which must be dryed on, and so keep them in a clean *Box*; and they will continue good a quarter of a Year.

In the last place touching *Compounded Pasts*, there are as many several sorts, as there are *Medicins* for the *Tooth Ach*; I shall take notice of some few, and such as are excellent and approved Secrets, referring others to be Treated of in their due places, when I come to speak of the particular ways of taking each sort of *Fish*.

If you take *Bean-flower*, and those parts of the *Rabets Legs* called the *Almonds*, or if it be of a fat young *Whelp*, or *Cat*, will do as well, add to them a like quantity of *Sheeps Suet*, and *Virgins Wax*, and beat them in a *Morter* till they are incorporated into one Body; then temper it with clarified *Honey* before a Gentle Fire, and make it up into *Balls*. When you use it, bait your *Hooks* Artificially with a little thereof, and you will find a notable Attractive quality in it. It will keep good at least a Year.

If you take the *Kidney Tallow* of a *Sheep*, and a like quantity of new *Cheese*, and beat them together, then adding so much *Wheat-flower* as will stiffen it; and kneading it before a *Fire*, allaying the stiffness of the *Past* with soft *Honey*, 'tis an excellent *Bait* for all or most *Fish*, and will keep good a long time.

Honey with the Crums of *White-bread*, made up stiff, is a good *Bait* for drawing *Fish* to it.

It is said that all strong Smells whether sweet or stinking will attract *Fish*, such as *Musk*, *Assafetida*, *Spermaceti*, Oyl of *Bays*, *Turpentine*, *Gommæ hederæ*; and likewise the sight of fine *Colours*, especially of *Flowers*, which have also a fine smell.

The next thing to be considered is the *Floating* in a *Pond*, or *River* for *Scale Fish*, and then take notice that *Feed* brings them together: Now there is no better Feed to be cast in than *Blood* and *Grains*, although *Past* is very good. Also *Crums* of *Houshold Bread* mixt with *Mans Dung* and made into *Past*, is said to be admirable to attract *Fish*, especially all white-scaled *Fish*. Also *Past* made of bruised *Hempseed* is very attractive.

CHAP. IX.

Some General Observations, Directions, and Cautions to be observed in Angling.

IT is Customary for every *Angler* to have his peculiar Haunt. Now for the attracting together the *Fish* in such a place, once in four or five Days cast in some *Corn* boyled soft; also you may cast in *Garbage*, *Worms* chopt into pieces, or *Grains* steept in *Blood* and dryed; But for *Carp* and *Tench* throw in some *Ground Malt* to keep them together.

If you *Fish* in a Stream, then cast in your *Grains* above your *Hook* down the Stream.

If when you are a *Fishing*, you would know what *Bait* the *Fish* at that time best love, when you have taken one, slit the *Gill*, and take out his *Stomach*, and open it without bruising; and you will there find what he last fed on, and accordingly bait your *Hook*.

In *Fishing* have a great care of wearing light and dazeling *Apparel*, but choose those that are dark, or sad coloured; also if possible shelter your self under some *Bush*, or *Tree*, or stand so far from the Bank side, that you can only discern the *Float*; for *Fish* are Timerous and Fearful of every thing they see.

The best way of *Angling* with the *Fly* is down the River, not up; and if you would have them to bite freely, be sure of having such *Baits* as they are Naturally inclined unto; and in such manner as they are accustomed to receive them. If your *Baits* be of *Past*, as before noted, for the keeping them on your *Hooks*, add a little *Flax* or *Wool*. The *Eyes* of *Fish* are said to be good *Baits* for all *Fish*.

Keep your *Rod* neither too dry nor too moist, for the one will make it brittle, and the other rotten.

CHAP. X.

Of the Natures, Qualities, &c. Of Several sorts of Fish, *with Directions to take them.*

THE *GUDGEON* is a small but excellent *Fish*, being not much inferior to the *Smelt*, for an excellent pleasant Tast; he *Spawns* three or four times in the Summer Season, and delights in swift Streams and gravelly Bottoms, lying low, so that he seldom bites eagerly; and if once he be struck, you can hardly lose him, being a leather Mouthed *Fish*. Your *Bait* must always Trail gently on the Ground, whether you use Float or not; some use a *Runing-Line*, without *Cork* or *Float* as for the *Trout*, but of all *Baits* the small *Red-worm* is the best; also *Wasps*, *Gentles* and *Cad-baits* are very good. In the Heat of Summer this *Fish* lyes scattered up and down in shallow places of the *River*; but in the Cold Weather they betake themselves to deep places, and accompany together. If you would catch store of this *Fish*, be provided with a long *Pole*, to stir up the *Sand* and *Gravel*, which will gather them together; and cause them to Bite more eagerly.

The *ROACH* is a leather Mouthed *Fish*, and being once struck, seldom loseth his hold, having his *Teeth* in his *Throat*, as all *leather Mouthed* Fish have; this is no delicate Fish, being so full of *Bones*, the best part is the *Spawn*; he is very easily taken, biting eagerly; and as the *Carp* for his cuning is esteemed the *Water-fox*, so this for his Simplicity is Termed the *Water-sheep*. They are great Storers of *Ponds* and *Rivers*, but those in the former are of less Esteem, though not so long.

This Fish *Spawns* about the middle of *May*. The general *Baits* are small white *Snayls*, *Cad-baits*, *Bobs*, *Sheeps-blood*, all sorts of *Worms*, *Gnats*, *Wasps* and *Past*; In *April* the *Cadis*, or *Worms* are proper; In the Hot Summer *Months* the *White Snayls* and *Flies*; but note they must be under *Water*, for they will not bite at the Top. In *August* any slight *Past* made of *Bread* and *Honey* kneaded into a *Past*, will serve well enough;

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enough; this will alſo ſerve in the *Winter*, but *Gentiles* are eſteemed a better *Bait* in the cold Weather: You muſt Fiſh about a Handful from the bottom. The *Black Ant-fly* which is plentifully to be found in *Ant* or *Mole-hills* about *Auguſt*, if it hath her Wings entire, is an excellent *Bait*, the like is the ſhort thick white *Worm*, which is uſually found at the *Plow-Tail*, at the breaking up of the Ground. Alſo young *Waſps* and *Bees* their Heads being dipt in Blood are excellent *Baits*. There are ſeveral other good *Baits*, as *Sheeps Blood* dryed hard, mixt with a little Salt to drain out the wateryneſs, and cut into ſmall pieces; alſo take a handful, or two of good *Wheat*, boil it in *Milk* till it be ſoft, then gently fry it with *Honey*, and a little beaten *Saffron* diſſolved in *Milk*.

DACE are much of the ſame Nature of the *Reach*, ſo that what Directions you find for the one, may ſerve for the other, with this Diſtinction, that *Dace* will Bite towards the top of the *Water* very freely, but better at the bottom: If you boil a Handful of *Wheat* in a little *Milk* until it be ſoft, and then fry it gently with ſome *Honey*, ſo that you break not the *Wheat*, 'tis an excellent *Bait*, eſpecially if in the frying you add a little *Saffron* diſſolved in two or three Spoonfuls of *Milk*. The ſeveral ſorts of *Cadis-Worms*, are alſo all proper *Baits* for this Fiſh. It will Bite at any *Fly*, but principally at *Ant-flies*, of which the blackiſh found in *Mole Hills*, in *June*, *July*, *Auguſt* and *September*, are the beſt; for preſerving them for uſe, put them alive into a *Glaſs-Bottle*, in which is ſome of the Earth from whence they are taken, with ſome of the Roots of the *Graſs* of the Hillock; then lay a Clod of Earth over it, and they will keep good a Month or two, provided you bruiſe not their *Wings*. The beſt time to take them is, when they Swarm, which is about the latter end of *July*, and beginning of *Auguſt*. The *White Worm* with the *Red-head*, found in new broken up Grounds that are Heathy or Sandy, are excellent *Baits* for the *Winter*. If you put them into a Veſſel with ſome of the Earth from whence they were taken they may be preſerved all the *Winter*.

The *CHUB* is known by the Name of a *Cheven*, or *Chavender*, in ſeveral places; he *Spawns* in *March*, is very full of forked *Bones*, and eats very Watériſh: Of all *Fiſh*, he is beſt to enter a young *Angler*, as being very eaſy to be taken greedily biting the *Bait*; and although he is a Leather Mouthed *Fiſh*, and will not eaſily get free, yet being ſtrong, you muſt give him play, for fear of breaking your *Line*. He delights to lie on the Top of the *Water*, but is of that fearful quality, that he will ſink down at the Shadow of any thing that he eſpies, were it a *Bird* that flyeth over the *Water*, but he ſoon riſeth up again.

Now for the taking this *Fiſh* obſerve theſe Directions; Find out ſome *Hole* (for he delights in ſuch places, and *Pools* rather than in *Rivers*), and in a hot day ſeveral of them will lie floating almoſt on the ſurface of the *Water*; and having your *Tackle* in readineſs, and your *Hook* baited with a *Graſſhopper* (which for that Seaſon is beſt) be ſure ſo to order your buſineſs (by abſconding your ſelf behind ſome *Tree*) that you are not eſpied; then caſt in your *Hook* gently about Two *Foot* before the *Chub*, that you deſign to take, and you will hardly miſs him: For want of a *Graſſhopper* you may uſe any great *Fly*, *Beetle*, or *Dor*, having his *Wings* cut off, and in Winter the *Brains* of a *Horſe* is a moſt certain *Bait* to take them; for they bite ſo greedily at it in the extremity of *Winter*, that you may in a manner clear a *River* of them, and indeed they will greedily Bite at any *Bait*.

In Hot Weather *Angle* for him near the *Top* of the *Water*, and in Cold near the Bottom; In *March*, and *April* Bait with *Worms*; In *May*, *June*, and *July*, with *Flyes*, *Snayls*, &c. and in *Auguſt*, *September*, &c. uſe *Paiſts*.

TROUTS are not only a delicate *Fiſh*, but afford great pleaſure in taking them. They Bite either high or low at *Flies* or *Ground-Baits*, in *Pooles* or in ſwift *Streams*: Tis pity he is not always in Seaſon, yet he comes in and goes out with good Company, *viz.* the *Stag* and *Buck*. His chief delight is in hard *Gravels*. The Spawns in *October*, and *November*, which is contrary to the Nature of other *Fiſh*, which *Spawn* in the Spring, which is a Seaſon moſt fit for generation.

The *Trout* is always lowſy, lean, and unwholſom, in Cold Weather; but when it begins to be Warm, he gathers ſtrength, and forſaking the ſtill and deep Streams, keepeth in the *Gravelly* and *ſhallow Waters*, for the rubing and cleanſing himſelf from his Lowfineſs; theſe *Lice* are a ſmall *Worm*, with a pretty big Head, and ſtick cloſe to his Sides, ſucking away his Moiſture.

The *Baits* moſt proper for the *Trout* are *Worms*, *Minnows*, or *Flies*, either Natural or Artificial; and of all *Worms*, thoſe called the *Dew-Worm*, *Lob-Worm*, and the *Brandling*, found in old *Dung-hills* are the beſt.

By the way remember that in *Fiſhing* with *Worms*, you always clap them alive on your *Hook*, and get ſuch as are ſtrong and luſty, ſuch as will ſtir and move a good while in the *Water* on your *Hook*; for when once they are dead, it is to little purpoſe to keep them on. For the preſervation of theſe *Worms*, keep them in a *Box* with *Moſs*, to nouriſh them, which muſt be often ſhifted, and their *Food* as often changed, eſpecially in the *Summer Seaſon*.

If you Fiſh with the *Minow*, or *Stickle-bag*, let it not be too big; or for want of Natural *Minows*, uſe Artificial ones; all the skill is in *Baiting* your *Hook*, which muſt be hid in the Mouth of the *Minnow*, and let the Point a little come out of his *Gill*, but his *Body* muſt be ſtrait.

Uſe neither *Cork* nor *Plumet* when you Fiſh for the *Trout*, either with *Minnows* or *Flies*, Natural or Artificial. Now concerning the *Flies*, I have already treated how to make them, however a word or two more. If you can *Bait* your *Hook* with a Natural *Live Fly*, ſuch an one as you perceive to uſe the *Water* at that time, and at which the *Trouts*, leap that is beſt; and next to that an *Artificial Fly* exactly made, for which take the aſſiſtance of ſome Expert *Fly-Maker*; for one

one Ocular Obſervation will make a deeper impreſſion than Twenty Verbal Lectures, for Example teacheth better than Precept.

In carrying your *Rod*, move it with an even hand, ſo as your *Fly* may gently touch the Top of the *Water*, cutting the Stream as it were juſt as you ſhall ſee the Natural *Flies* do.

As for *Paiſts* they are not very kindly for *Trouts*, unleſs for old large ones, which are difficult to be got out of their *Holes*, unleſs by Night; for they are as crafty as old beaten *Hares*. When you ſuſpect that any lie concealed in *Holes*, then go out in the *Evening* and *Bait* your *Hook* with any *Paiſt*, drawing it gently on the Top of the *Water*; and the *Trout* will then make to it very greedily; but be ſure lie concealed if it be *Moonſhine*, for this *Fiſh* is exceeding quick-ſighted, and very coy, ſo that the *Mornings* and *Evenings*, are the beſt, except in *Gloomy Weather*.

The *EEL* was by the *Romans* eſteemed the *Helena* of their *Feaſts*, as being ſo dainty a *Fiſh*; moſt men differ about their Breeding, for ſome are of Opinion, that they Breed by Generation as other Fiſh, whilſt others ſay, that they are Bred of *Mud*, or other putrifaction of the *Earth* (as are *Rats*, *Mice*, and many other *Creatures*) and deny them to have either *Spaw*, or *Melt*; others hold that when they grow Old, Breed others out of the Corruption of their Old Age; and others are of Opinion, that they are Bred of a particular *Dew* that falls in the Months of *May* or *June*, on the Banks of *Rivers* or *Ponds*, which in a few days, by the heat of the *Sun*, is turned into ſmall *Eels*; and theſe are by ſome called *Telvers*.

It is by Experience found, concerning the Breeding of *Eels*, That take two large *Turfs* of *Graſs*, which cut about a *Foot* ſquare and Three *Inches* thick, lay them *Graſs* to *Graſs*, tie them together with *Pack-Thread*, and lay them in a Pond in *May*, and they will Bred *Eels*; and this may be done for the ſtoring *Ponds* therewith.

The moſt Curious have diſtinguiſhed *Eels* into four ſorts, *viz.* the *Silver Eel*; the *Greeniſh Eel*, which is called a *Greg*; the *Blackiſh Eel*, which hath a broad flat Head, and the *Eel* with Rediſh *Fins*. I ſhall only ſpeak of the *Silver Eel*, which is believed to be Bred by *Generation*, and not by *Spawning*, the young coming forth alive from her about the length and bigneſs of a middle ſized *Pin*; and this ſort is eſteemed the beſt and deliceteſt *Diſh*

Eels delight in *Muddy Banks*, and in Rotten Roots of Old *Trees*, that grow on the Banks of *Rivers*. The beſt places to Fiſh for them with an *Angle* are at *Mill-Ponds*, *Wears*, *Bridges*, great *Falls*, and the like; Your *Lines* muſt be ſtrong, not very long, well *Plumed*, and muſt have a good round *Hook* without a *Cork*; for you muſt hold your *Line* ſtiff, and not to pull ſmartly, but ſuffer him firſt to tire himſelf. They ſeldom ſtir out of their *Holes* during the Winter Seaſon, but keep in the *Mud*; nor do they much ſtir abroad at any Seaſon in the Day, ſo that the moſt proper time to take them is in the Night.

The beſt *Baits* to take them are the *Red Worm*, the *Minnow*, pieces of *Sheeps*, or *Hens-Guts*, young *Lampries*, or *Lamperns*, but above all, pieces of raw powdred *Beef*; Now the ways to take *Eels* with the ſaid *Baits* are as followeth: Faſten your *Line* to the Bank-ſide with your laying *Hooks* in the *Water*, or you may throw in a *Line* with good ſtore of *Hooks Baited* and *Plum'd* with a *Float*, to diſcover where the *Line* lieth; that when you come in the *Morning*, you may take it up with your *Drag-Hook*.

Bobing for EELS.

THere is a way to take *Eels*, *viz. Bobing*; that is take very large *Lobs*, ſcour them well, and with a *Needle* run ſome ſtrong twiſted *Silk* through them from End to End; then take ſo many as to wrap them about a *Board*, at leaſt a dozen times, and tie them faſt with the two Ends of the *Silk* that they may hang in ſo many Hanks; then faſten all to a ſtrong *Cord*, and about four *Inches* above the *Worms* faſten a Plum of about Three quarters of a Pound, and ſo faſten your *Cord* to a ſtrong *Pole*: Having thus your *Tackle* ready, chooſe a *Muddy* Place to Fiſh in, and when you think they have ſwallowed them as far as they can, draw up your *Line* gently, and bring them to Shoar.

Snigling for EELS.

THere is another way to take *Eels*, called *Snigling*; this is done in the Day, and after this manner: Take a ſtrong *Line* and *Hook* Baited with a *Lob*, or *Garden Worm*, and obſerving ſuch Holes and places where they uſe to lie (as near *Wears*, *Mills*, or *Flood Gates*) and gently by the help of a Stick, putting your *Bait* into ſuch *Holes* or *Places* where you think they lie, you will hardly miſs taking them; but be careful of pulling it out too boiſterouſly.

Eels are alſo taken by *Eel Spears*, which you are to ſtrike into the *Mud* to the bottom, where they lie. Theſe *Spears* are common and known to all. And this way is beſt in Winter, for then they lie in deep, *Muddy*, *Sedgy-Beds*, many together.

FLOUNDERS delight in Brackiſh Streams, wherein the Salt-Water Ebbs and Flows, as the *Thames*, *Medway*, *Severn*, and the like; yet will they get up a good way into Freſh Streams, where they will thrive very well. It is a *Fiſh* that affords good ſport to the *Angler*, and are greedy biters; nevertheleſs they are crafty, ſo that you muſt not let your *Bait* lie ſtill to draw them on the more eagerly. The Months moſt proper to Fiſh for them are in *April*, *May*, *June*, and *July*, at any time of the Day; they delight to lie either in a ſwift Stream, or in the ſtill Deep, but chiefly in the *Stream*. The beſt *Baits* are the *Red Worms*, *Waſps* and *Gentles*, your *Line* muſt be ſtrong, and Plumbed within Eight *Inches* of your *Hook*. The *Flounder* will thrive and grow exceedingly in *Ponds*, but will not Breed there.

The *CHAR* is a Fiſh not known to be taken any where but in *Wimander-Meer*, in *Lancaſhire*; It is eſteemed a delicate Diſh, and is oft uſed for *Pies*, and ſent to *London* for Preſents. 'Tis a Spotted Fiſh, like a *Trout*, and ſeldom exceeds a

Foot

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Foot and an half in length, being free from *Bones*, having ſcarce any but what is on his Back. This Fiſh is for the generality taken with *Nets*.

The *GUINIAD* is an excellent Fiſh, and only found in *Pemble-Meer*, and generally taken alſo with *Nets*.

The *GRALING*, and the *UMBER*, are by ſome eſteemed all one Fiſh, but differ in ſize, as the *Herring* and *Pilcher*, and are much of the nature and property of the *Trout*, but ſcarce ſo big. They delight in clear ſwift Streams, with *Sandy* Shoars, and are taken with the ſame *Baits*, and after the ſame manner; but eſpecially the *Fly* is the chief *Bait*, at which he is very greedy and bold. He is no *Leather-mouthed* Fiſh, therefore eaſily loſt after he is ſtruck. In the Winter he lyeth very cloſe; but after *April* he appears, and is eaſily taken. But the beſt Fiſhing for the *Graling* is to go into the Water, and to ſtir up the *Gravel* and *Sand* with your *Feet*, or with a *Pole*; and then with a *Worm* Fiſh down the Stream, where the Water runs thick.

You ſhould do well to Head your *Hook* upon the *Shank*, with a very ſlender narrow Plate of *Lead*, and let it be ſlenderer at the Bent of the *Hook*, that the *Bait* may the eaſier come over it; and keep your *Bait* always in Motion.

The *STICKLEBAG* is a ſmall prickly Fiſh without *Scales*, and not Fiſhed for, but for *Baits* to catch other Fiſh.

The *MINNOW* is alſo a ſmall Fiſh without *Scales*, and uſed alſo for a *Bait* for other Fiſh. It is a great *Spawner*, and ſerveth as well for a *Prey*, as for a *Bait* for Fiſh; the like is the *Stickle-bag*.

The *BARBEL* is a *Leather-mouthed* Fiſh, and though he ſeldom breaks his hold when *hooked*, yet he oft breaks both *Rod* and *Line*, if he proves to be a big one. The Male is eſteemed much the beſt, but neither very good. They ſwim together in great *Shoals*, and are at their worſt in *April*, about which time they *Spawn*, but ſoon come in Seaſon. This Fiſh loves to frequent Weedy places, and in a Gravelly riſing Ground, wherein he is ſaid to Root with his Noſe, like a *Hog*: In the Summer he alſo frequents the ſtrongeſt Swifts of the *Water*, as deep *Bridges*, or *Wears*, &c. amongſt the *Piles*, *Hollow Places*, and *Weeds*; but in the Winter he retires into deep Waters, and there helps the Female to make a Hole in the *Sand* for her *Spawn*, which ſhe hideth from being devoured by other Fiſh. It is a very cuning and curious Fiſh for his *Baits*, for if they be not clean, ſweet, and well ſcoured, and kept in ſweet *Moſs* he will not Bite, which if well ordered, and curiouſly kept, he will Bite with great eagerneſs; the beſt *Bait* is the *Spawn* of a *Salmon Trout*, or any other Fiſh; and if you would have good Sport, *Bait* the places where you intend to Fiſh therewith a Night or two before, or with big *Worms* cut into pieces; and the earlier in the Morning, or later in the Evening that you Fiſh, it is the better; Alſo the *Lob-worm* is a very good *Bait*: Be ſure to cover all your *Hook* with the *Bait*. Your *green Gentles* are alſo a very good *Bait*, and ſo are bits of tough *Cheeſe*, laid a ſteep about Twenty four Hours in Clariſied *Honey*; and if you *Bait* the Ground with the ſame you can hardly miſs taking them, if there be any. Your *Rod* and *Line* muſt be both long and ſtrong, and let him tire himſelf before you Land him; for it is a ſtrong *Fiſh*, and will ſtruggle much.

BREAMS are of two ſorts, the one a *ſalt*, and the other a *freſh Water* Fiſh, but differ little from each other as to Taſt, Shape, or Nature. The *freſh Water* ones breeds in *Ponds* and *Rivers*, but delight beſt in the former, and are generally fairer and fatter in them than in *Rivers*. It is a luſty ſtrong Fiſh, ſo that your *Tackling* muſt be very good; he hath two Sets of *Teeth*, is a very great Breeder; the *Melter* being obſerved to have two large *Melts*, and the *Spawner* as many Bags of *Spawn*, and Spawneth in *June* and *July*. The beſt Seaſon for *Angling* for him, is from St. *James-Tide* until *Bartholomew-Tide*.

This Fiſh is a great lover of *Red Worms*, eſpecially ſuch as are to be found at the Root of great *Docks*, alſo *Flag-worms*, *Waſps*, *Greenflies*, *Graſhoppers*, which muſt have their Legs cut off, and *Paiſt*, of which there are many ſorts, which are found very good *Baits* for him; but the beſt are made of *Brown-Bread* and *Honey*, *Gentles*, young *Waſps*, *Graſs-hoppers*, and the *Red Worms*.

It is a curious Fiſh to be taken with *Hook* and *Line*, therfore obſerve theſe Directions, which may alſo further you in your *Carp-fiſhing*, which is much of the ſame Nature. Get a Quart of large *Red Worms*, and in about three Weeks they will be throughly ſcoured, if you put them into freſh *Moſs* well waſht and dryed every three or four Days, feeding them with fat *Mould* and chopt *Fennel*.

Your *Lines* ſhould be *Silk* and *Hair*; but the beſt are all *Silk*. Your *Floats* ſhould be *Swan-Quill Floats*, or large *Gooſe-Quills*. For your *Plumb* take a piece of *Lead* faſhioned like a *Pear*, with a ſmall *Ring* at the little End of it; faſten your *Lead* to your *Line*, and your *Line-Hook* to your *Lead*, about ten or twelve *Inches* ſpace between *Hook* and *Lead* is ſufficient, and be ſure your *Lead* is heavy enough to ſink the *Float*. Your *Hook* being well baited, and your *Worm* ſtrong, the *Worm* will draw your *Hook* up and down on the Bottom, which will provoke the *Bream* to bite the more eagerly.

If you fit three or four *Rods* and *Lines* in this manner, and ſet them as ſhall be directed, your Sport will be much the better. Get the exact Depth of the *Water* (if poſſible) that your *Float* may lye juſt equal with the Water, directly over your *Lead*. Then provide this following *Ground-Bait*; Take about a *Peck* of ſweet Groſs-ground *Malt*, and boyl it a very little; then ſtrain it hard through a *Bag*, and carry it to the Water-ſide where you have Sounded, and where you ſuppoſe the Fiſh do frequent, there throw in the ſaid *Malt* by Handfuls, well ſqueezed, that the Stream may not ſeparate it before it comes to the Bottom; and be ſure to caſt it in at leaſt a *Yard* above the place where you intend your *Hook*

Hook ſhall Lodge, otherwiſe the Stream will carry it ſomewhat down. Do this about Nine of the Clock at Night, and preſerve ſome of your *Malt* in your *Bag*, and about Three in the Morning Viſit the place, but with great care at a diſtance, leaſt you are eſpied by them; for it is certain, that they have their *Sentinels* watching on the Top of the Water, whilſt the reſt feed under; then dexterouſly Bait your *Hook*, ſo that the *Worm* may crawl too and fro the better to entice the Fiſh to bite; and where you find the Fiſh to play moſt, and ſtay longeſt (which is generally in the deepeſt and broadeſt part of the *River*) there caſt it in, that it may reſt about the midſt of your *Bait* that is on the Ground. Caſt in your ſecond *Line* to reſt about a *Yard* above that, and a third about a *Yard* below it. Let your *Rods* lye on the *Bank*, with ſome *Stones*, or the like, to ſtay them at the great Ends, and then withdraw your ſelf, yet ſo as to have in your Eye all the *Floats*, and when you ſee one bitten, and carried away, be not over-haſty to run in, but give time to the Fiſh to tire himſelf, and then gently touch him.

If there be any *Carps* in the *River*, 'tis an even lay you take one or more of them; and if there be any *Pike*, or *Perch*, to be ſure they'l viſit the *Ground Bait*, though they touch it not, being drawn thither by the great reſort of the ſmall Fiſh; and until you remove them 'tis in vain to think of taking the *Bream*, or *Carp*. In this caſe let one of your *Hooks* be baited with a ſmall *Bleak*, *Roach*, or *Gudgeon*, about two *foot* deep from your *Float*, with a little *Red Worm* at the Point of your *Hook*, and if a *Pike* be there he will be ſure to ſnap it.

This Sport is good till Nine in the Morning, and in a Gloomy Day till Night; but however it is good to withdraw; and about Four in the Afternoon caſt in the remainder of your *Malt*, and proceed as before; but do not frequent one place too much, leſt the Fiſh grow too crafty for you.

The *TENCH* (for the moſt part) lieth at the Bottom of the Water, and chiefly in Muddy Soyls, and amongſt *Weeds*; he delights in *Pits* and *Ponds*, more than in *Rivers*; his Fleſh is very good, and of a pleaſant Taſt, although he frequents Muddy places: In the Heat of the *Year* he will Bite freely, elſe not; therefore the beſt Seaſon for *Angling* is in *June*, *July*, and *Auguſt*, and early in the Mornings, and late at Nights.

Though the *Pike* preys on moſt ſorts of ſmall Fiſh, yet he will not touch a *Tench*, which is ſuppoſed to proceed from the benefit he receives from them in point of Health; for being ſick, the approach of this Fiſh to rub againſt him revives him, and the Slime is very good for all wounded Fiſh, and therefore he is called the *Fiſhes Phyſician*. Authors write ſtrange Vertues to be in the *Tench*; but how true, I dare not affirm.

Though *Baits* which the *Tench* delights in are ſweet *Paiſts*, as that which is made of *Brown-Bread* and *Honey*; he will alſo Bite very greedily at any *Paiſt* wherein *Tar* or *ſweet Oil* is an Ingredient; alſo at the *Maggot*, *Red Worm*, *Cad-Worm*, *Lob-Worm*, *Gentle*, and at dryed *Waſps*, eſpecially if dipt in *Honey*.

To take good ſtore of this Fiſh obſerve theſe Directions: Provide your ſelf with a good large *Caſting-Net* well *Leaded*, with a large *Meſh*, and deep tucked; then make the place (where you intend to Fiſh) clean from *Stakes* and *Buſhes* with a *Rake*, or ſome ſuch thing, that there may be nothing to entangle it; then take a quarter of a Peck of *Wheat* baked well in an Oven, with about three Quarts of *Water*, alſo five Pints of *Blood*, and mix it with the *Wheat* well together, adding thereto as much *Bran* as will make it become a ſtrong *Paiſt*; then take about a Quart of *Lob-Worms* chopt in pieces, and mix them in the *Paiſt*, and make it up into Balls about the bigneſs of a *Gooſe-Egg*, and throw them into the *Pond* within the compaſs of the *Caſting-Net*, and betwixt whiles caſt in ſome *Grains*; then when you think the Fiſh have found the Baiting place, about the Cloſe of the Evening caſt in your *Net* over the ſaid Baiting-place. This being done, have a long *Pole* with a large *Cork* to ſtir all about the *Net* to raiſe the Fiſh, which are generally ſtuck in the *Mud*, where they can't long endure, and let the *Net* lye near half an hour before you take it up, and be ſure to lift up the Crown of the *Net* upright with a long *Staff*, that the Fiſh may play in the Tuck of the *Net*.

The *PERCH* is a bold biting Fiſh, being one of the Fiſhes of *Prey*, that like the *Pike* and *Trout* he carries his *Teeth* in his Mouth, which are very large; and he is ſo Voratious, that he dares attack one of his own kind, vvhich the *Pike* vvill hardly do: He hath an hooked or Hog *Back*, vvhich is armed vvith ſharp and ſtiff *Briſtles*, and all his *Skin* is covered vvith dry hard *Scales*, having two Fins on his *Back* vvhich few other Fiſh have; he is alſo a ſlow grower, and ſeldom exceeds two *foot* in length; he *Spawns* but once a year, and that in *February* or *March*. There are ſaid to be two ſorts of *Perches*, the one Salt Water, and the other Freſh; the firſt hath but one Fin on his *Back*, the other hath two. By the *Phyſicians* this Fiſh is held very nouriſhing, but hard of digeſtion.

The *Perch* biteth vvell all the Day in Cloudy Weather, but chiefly in the Morning and towards the Evening: The beſt Seaſon of the *Year* is vvhen the *Spring* is far ſpent, at vvhich time he Bites ſo greedily, that you may take at one ſtanding all that are in one *Hole*; and in a fair vvarm Day in the *Winter* he will alſo Bite, elſe not.

The proper *Baits* for the *Perch* are the Belly of a *Mackrel* cut into ſmall pieces about the ſize of a *Minnow*; the ſmall *Frog*, the *Minnow*, and the *Worm* called the *Brandling*, if vvell ſcoured is the beſt; you may alſo uſe the *Lob-Worm* vvell ſcoured, likewiſe *Bobs*, *Gentles*, *Oak-Worms*, *Waſps*, and *Cad-Baits*.

The *Perch* is no *Leather-mouthed* Fiſh, and therefore vvhen he Bites give time enough to pouch his *Bait*, and carry your *Bait* about Mid-Water, vvith a *Cork* on your *Line*.

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If you *Bait* with a *Minow* (which affords the moſt diverſion), Fix your *Hook* through his upper *Lip*, or in at the *Back*, only taking up the *Skin*, and then he will Swim up and down, being kept up by the *Cork* and *Line*. If you *Bait* with a *Frog*, then put the *Hook* through the *Skin*, and his *Leg* towards the upper part.

Your *Line* ſhould be good and ſtrong, and a good *Hook* Armed with *Wyre*, ſo that if a *Pike* comes you may be prepared for him. But before you go to your *Work*, it were not amiſs to *Bait* the Ground where you intend to Fiſh over Night, with *Lob-Worms* chopt in pieces.

The *BLEAK* is by ſome called the *Freſh-Water Sprat*, or the *River-Swallow*, by reaſon of his continual Motion, for it delights to be on the Top of the Water, and always in Motion, making ſhort and quick turns to entrap the *Flies*. He is an eager biter, and is caught with all ſorts of *Worms* bred on *Trees*, or *Plants*; alſo with *Flies*, *Paiſt*, *Sheeps-Blood*, &c. and in an *Evening* the *Bleak* will take the *Natural*, or *Artificial Fly*, that is but ſmall, and of a Browniſh Colour, with a *Hook* anſwerable.

This *Fiſh* uſeth to keep in Company together, ſo that a *Pater-Noſter Line* is good to take them; that is, a *Line* which Seven or Eight ſmall *Hooks* faſtned to it, at every Six *Inches* diſtance, and with this a reaſonable *Angler* may take Four or Five at a time.

The beſt *Bait* in a warm clear Day is the ſmall *Fly*, at the Top of the Water, at which they will Bite very eagerly, eſpecially in the *Evening*; and if it be cold and cloudy, *Gentles*, or *Cadice* are the beſt, and to Fiſh at about Two *Foot* under Water.

There is an excellent way to catch *Bleaks*, by whiping them in a *Boat*, or on a *Bank-Side*, in ſwift Water in a Somers *Evening* with a *Hazel* Top about Five or Six *Foot* long, and with a *Line* about twice the length.

The *POPE*, or *RUFF*, is a Fiſh not very common, eſpecially in ſome Rivers; for Shape it is like a *Perch*, but for bigneſs ſeldom exceeds the *Gudgeon*. It is an excellent taſted *Fiſh*; they bite freely and keep in *Sholes*, where the Water is deep, and runs quick, ſo that an *Angler* may catch Forty, or Fity at one ſtanding.

Your *Bait* is the ſmall *Red Worm*, and if you give him firſt a Ground *Bait* of freſh Earth, it is very good to draw them together, and to keep them there. *Bob-Worms*, and *Maggots* are alſo good *Baits*, and generally all ſorts of ſweet *Paiſts*.

The *PIKE* is a Fiſh of a great ſtrength, is ſaid to live longer than any other *Fiſh*; he is a great devourer of all ſmall *Fiſh*; but will not meddle with the *Tench*: They are bred ſome by Generation, and others by the *Suns* heat reflecting on ſecret, and unknown prediſpoſed Matters, which is a Truth paſt Controverſy.

He is of ſuch a Voratious Nature, that he is called the *Freſh-Water Wolf*; he is a Melancluly Fiſh, and loveth to be alone, as greedy to ſeek his *Prey*, his common Food is either *Pickerel-Weed*, *Frogs*, or ſmall *Fiſh*. The beſt *Pikes* are found in Rivers, and moſt in *Meers* and Ponds.

The *Pike* is a Bold Fiſh in this reſpect, that he feareth not to ſee or to be ſeen by a Man, which is contrary to the Nature of all other *Fiſh*. You may Fiſh for him with *Ledger*, or a *Walking-Bait*, the former is fixed to ſome certain place, of which hereafter; for the latter it is which is now to be handled.

The ſkill in *Baiting* your *Hook* with a *Frog*, or *Fiſh*, ſo that they may receive little hurt, and to live long in the Water after, is the chief thing in this Art of *Pike-Fiſhing* with an *Angle*. To be exact at it, do thus; Take the *Telloweſt Frog* you can get (for thoſe are not poyſonous, and *Pikes* are greedy of them) from *April* till *Auguſt* you may find their Mouths open, but all the year after quite lockt up, ſo that how they can then feed is a ſecret in Nature not known; having ſuch a *Frog*, put your *Arming Wyer* through his *Mouth*, and out at his *Gills*; then with a *Needle* and *Thread* ſtitch up the upper part of his Leg to the ſaid *Arming-Wyer*, and ſo fix it; one Stitch is enough, and do it ſo as not to give him any hurt, that he may continue in full ſtrength: Alſo cut a little the skin of his *Back* and put in ſome Salt; this will make him Croak, or Cry, which will the ſooner draw the Fiſh to him.

If you *Bait* with a Fiſh, let it be either a *Perch*, *Roach*, *Daice*, or Large *Minnow*; the manner is thus, Between the Head and Fin or the Back make an Incifion with a ſharp pointed *Pen-Knife*, that you may put in your *Arming-Wyer*, and force it out at another Skar at the lower end of the Back near the Tayl, then tie him about with a *Thread*, but no harder than juſt to keep on the Fiſh and not to hurt it. If you uſe a dead *Bait*, then put your *Hook* in at the *Tayl*, and let the Point come out juſt at the *Gills*, and ever move your *Line* to and fro, that the *Pike* ſeeing the Fiſh move, may not diſcover your Fraud, and be provoked to come on the more eagerly. The moſt excellent attractive way for a *Pike* is to anoint your *Baits*, whether dead or alive, in a little *Fay-Gum*, diſſolved is ſome *Oyl* of *Spike*, and caſt it where you intend to Fiſh, and having lain a little while at the Bottom, draw it to the Top, and ſo up the Stream, and if there be any *Pikes* within ſent of it, they will eagerly purſue the *Bait*, and the bigger the *Bait* is the better. Having taken one be ſure to tire him well before you Land him, and let your Hook be well armed, and your *Line* all of *Silk*, except within about a *Yard* of the *Hook*, which muſt be a ſtrong *Wyer* twiſted and ſtrengthend about with other ſmall *Wyer*.

In *May*, *June* and *July*, *Pikes* are ſaid to go a *Froging* in Ditches, and do alſo lie a *Suning* themſelves; at theſe times they are eaſy to be taken, and that by this means; Take a *Line* of Seven or Eight *Foot*, then *Arm* a very large *Hook* to the *Line* which muſt be neatly *Leaded* at the *Shank* of the *Hook*, and of ſuch a weight that he may guid the *Hook* at pleaſure, and with this *Hook* without a *Bait* a *Pike* may be ſtruck without fear of loſing it.

TROWLING for the PIKE.

THere is a way to take *Pikes* called *Trowling* which is thus done; Take a *Hazel-Rod* about Twelve *Foot* long, then fix to the Top of the *Rod* ſome ſtrong *Wyer*, which muſt have a Nooſe to draw up, when you have entangled the *Pike*.

Snapping for PIKES.

THis is thus performed, put a ſtrong double *Hook* well Armed upon a very ſtrong *Line*, which muſt be of the length of your *Pole*. Bait the *Hook* as before directed for the *Trowling*, either with a ſmall Fiſh, or for want thereof with a ſmall *Bird*, his *Feathers* being all pulled off. Keep your *Bait* always moving, and ſo ſoon as the *Pike* Bites, with a ſtrong ſmart Jerk ſtrike, and fling him out of the *Water*.

There is another way to take the *Pike*, and that is, take a forked Stick with a *Line*, about twelve Yards long wound upon it, and leave at the upper end about a Yard to tye a *Bladder*, or ſome thing to keep it from the Ground. The *Bait* muſt be a live Fiſh, *viz.* a *Dace*, *Gudgeon*, or *Roach*. The forked Stick muſt have a ſlit in the one ſide of the Fork to put in the *Line*, that the live *Fiſh* may be ſet to ſwim at a Gage; and that when the *Pike* takes the Bait, he may have the full liberty of the *Line* for his Feed.

This Device may be turned looſe either in a *Pond*, or *River*, and be carryed about with the *Wind* or *Stream*.

The *Hook* muſt be large, and the *Shanks* ſomething ſhorter than ordinary; and it muſt be Armed either with ſmall *Wyer* ſoftned, or with Twiſted Silk, which is eſteemed the beſt.

The *SALMON* is ſaid to be the King of *Freſh Water Fiſh*, and is always bred in Rivers near the Sea, yet where they are not *Salt*. He caſts his *Spawn* in *Auguſt*, making a Hole in ſome ſafe gravelly place in the River, and therein hide their *Spawn*, covering it over with *Stones*, and *Gravel*, and ſo leaves it; and both the *Melter* and the *Spawner* betake themſelves to the Sea before *Winter*, and if they meet with any Obſtructions by *Floodgates*, or *Wears*, or become loſt in the freſh *Waters* then thoſe ſo left do by degrees become Sick, Lean, Unſeaſonable, Pineing away and dye in about two Years; notwithſtanding which they delight moſt in freſh *Waters*, nor will they be ſo fat, and good in ſalt *Water* as in the freſh; and 'tis obſerved that thoſe little *Salmons* called *Sheggers*, are bred by ſuch ſick *Salmons*.

The *Salmon* uſually ſtays not long in a place, but covets to get nearer the Spring Head, and generally keeps in the middle of the *River*, and near the Ground, ſo that it is the more difficult to Fiſh for them with the *Hook* and *Line* from the Banks ſide; you ſhould therefore be provided with a ſmall *Boat* at *Anchor*, and from thence you may caſt out your *Hooks*. Your *Tackling* muſt be ſtrong, and well fitted, for you are to encounter with a Fiſh of Strength and Greatneſs. He biteth beſt at about three a Clock in the Afternoons in the Months of *May*, *June*, *July* and *Auguſt*, eſpecially if the *Water* be clear, and that there be a ſmall breez of Wind blowing againſt the Stream.

The *Baits* proper for the *Salmon*, are the ſame as for the *Trout*, but above all others he will Bite beſt at the *Garden-worm* called a *Lob-worm*, provided it be well ſcoured, and kept clean in *Moſs*, as formerly directed; and if you anoint the *Box* wherein you put the *Worms* only three or four at a time, about an hour before you uſe them, with two or three Drops of the Juice of *Ivy-berries*, or Oyl of *Polypody* of the *Oak* mixt with *Turpentine*, it is an excellent Attractive.

There is a way to Fiſh for the *Salmon*, with a *Ring* of *Wyer* at the end of your *Rod*, through which the *Line* may run to what length you pleaſe, by which means he will not come to feel the Strength of the *Line* or *Rod*, for it is to be feared if he ſhould, he would with a Jerk of his *Tail* break either the *Line*, or *Hook*, and ſo eſcape.

The *Artificial-fly* is a good *Bait*, but you muſt uſe a *Trowl* as for the *Pike*, and your *Fly* muſt be large, with the *Wings* and *Tail* very long. Be ſure to give him time to gorge the *Bait*, and be not over haſty in drawing him up, but let him plung and tire himſelf.

The *MILLERS THUMB*, or *BULLS-HEAD* is a broad Headed, and wide Mouthed Fiſh, having two *Fins* under his *Belly*, and as many near his *Eyes*, which are broad; he hath alſo *Fins* on his Back. This Fiſh begins to *Spawn* in *April*, and are full of *Spawn* all the *Summer* Seaſon. He delights in *Holes*, or amongſt Stones in clear *Water* in the *Summer*, but in the *Winter* frequents the muddy places like the *Eel*. In Hot Weather he uſeth to lye ſuning himſelf in ſhallow gravelly places, and is eaſily taken not refuſing your *Bait*, the beſt being the *Red-worm*. It is an excellent Fiſh for Taſt, but of ſo ill a ſhape much reſembling the Toad, that it is not much regarded.

In the laſt place I ſhall ſpeak of the *CARPE*, in the taking of which there lies the main skil of an *Angler*.

CARPS are ſaid to be of no long continuance in *England*; It is an excellent Fiſh, a great Encreaſer; Breeding ſeveral Months in the Year, which *Pikes* and moſt other Fiſh do not; and it ſeems to be true, becauſe that you ſhall ſcarce take a *Male-Carp* without a *Melt*, and a Female without a *Row* or *Spawn*, eſpecially all the *Summer* Seaſon; and by Obſervation they agree more naturally in *Ponds* than *Rivers*, or *Runing Streams* if they Breed there at all. In ſome *Ponds* they will alſo not Breed; and ſuch are thoſe that have too cold *Springs*, but in *Ponds* agreeable to them, provided their *Spawn* is not devoured by *Pikes* or *Pearch*, they greatly encreaſe. I ſhall elſewhere give you ſome *Rules* for the knowing a *Breeding Pond* from a *Growing* one, with ſome Directions for the well ordering the ſame.

The *Carp* is a leather *Mouthed Fiſh*, ſo that if your *Hook* be once ſtruck into his Chaps, doth ſeldom break his hold. He is the moſt Subtile Fiſh that is, and not eaſily taken by the *Angle*, eſpecially in *Rivers*, or in ſome *Ponds*, where they have ſtore of *Feed* and the *Water* is of a clayiſh colour. The *Carp* will ſeldom Bite in cold Weather, and in the Hot Seaſon you can

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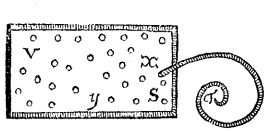
can scarce be too early or too late at your Sport, for he is a very difficult Fish to be taken: In the Heat of the *Summer*, they shew themselves on the top of the *Water*, at which time if you Fish with the *Lob-worm*, as you do with the *Natural-fly*, you will have very good Sport, especially if it be amongst *Reeds*.

If your *Carps* Breed too fast in your *Stews*, then put in some *Gudgeons*, which will cause them to grow Fat and Thrive; and so lessen their Breeding.

The *Baits* most proper for the *Carp* are *Worms* or sweet *Paists*, of which there are great variety, for he is a Fish that seldom troubles the top of the *Water* for Flies. Of *Worms* the *Blew Marsh-worm*, the *knotted Red Worm*, and the *Gentle* are the best; if you Fish with *Gentles*, anoint them with *Honey* before you put them on your *Hook*. As for *Paists*, those that are made of sweet smelling, and sweet tasting things are the best. *Honey* and *Crums* of White Bread is very good, being wrought up very stiff. Also *Bean-flower*, or other *Flower*, *Virgins Wax*, some raw Flesh of a *Rabet*, or such like, being beaten well together in a Mortar to a *Paist*, is a very good Bait for them.

When you *Angle* for a *Carp*, your *Rod* and *Line* must be strong, and by reason he is so shie, it is very good to Bait the Ground where you intend to Fish two or three Days before, with some *Paist* made up into *Pellets*, or *Blood* mixt with *Bran*, and *Cow-Dung*; also take about a peck of *Ale-grains* mixt with Blood, and cast into the place over Night, and it will gather the Fish together.

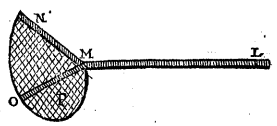
But all this while you are Detained from the chief Secrets, which in Truth should not be made common. You must be first assured that the place where you Fish for *Carps* is provided therewith, which to know make use of these following Directions, not that they tend barely to make the Discovery and no more; for you must find other necessary uses made of them, for Instance, you Bait your Fish thereby, and make them bold; you also obtain a safe and sure place for your *Hook* to rest on, which is a good Conveniency; and you are also assured that there are *Carps* in the place, the *Figure* shews the Form.



Frame same *Bords* together of such Length and Breadth as you think fit, but for want of other Conveniencies, an old *Door* may serve the purpose, but the larger your *Platform* is, so much the better. The end Q is that which must lye next the *Water* side, at the Letter *S* make a Hole to receive a good strong *Cord*, fastned with a knot on the inner side, then store over your *Door* with strong *Earth* or *Clay* about two *Inches* Thick; and so stiff, that it may not easily dissolve, nor work off with the *Water*, then stick the said Earth full of *Beans* (prepared as hereafter) at every four *Inches* Distance; the Letters *V*, *X*, *Y*, denote them; they must be very gently put in, so as a *Carp* may easily Bite them out, yet so fast as not to be washed out by the *Water*. When all is fixed, let the end Q be put into the *Water* sloping downwards, then when the Hole is close; on the bottom fasten the *Cord T*, at the Root of some Tree; the next Morning visit your *Baits*, put out your *Door* leasurely; if the *Carps* have eaten the *Beans*, 'tis a good sign of catching some, but if not, try it a second Day and Night; if you then also find the Beans unmoved, conclude there are no *Carps*. If you find the second time your *Baits* eaten, Replenish them, and think not your time lost. In case the bottom of the *Water* where you set your *Door* be clean and smooth, then remove your *Door*, casting in two or three Handfulls of the aforesaid *Beans*; but in case the Ground be *Muddy*, *Weedy*, *Rooty*, or the like, let the *Door* be *Rebaited*, and returned to the place where it was, for there you may boldly let fall your *Hook*. The way of ordering your *Beans* is thus. Take half a *Bushel* of *Beans*, and let them lye seven or eight Hours in warm *Water*, then Boil them in a large clean Earthen Pot in four *Ounces* of *Honey*, and as many Grains of *Musk*; then boil them about a quarter of an Hour, and so preserve them for your use, to Bait your *Door*, &c.

When you perceive that *Carps* are in the place, and that they bite your *Bait*, then the Night before you Fish do thus; Put in some of your aforesaid *Beans* into some *River Water* to Boil, and when they begin to bubble, put the quantity of two small *Beans* of *Aloes-cicatrina* into your Pot to about a Handful of your *Beans*, and let it Boil a little; when the *Beans* are cold *Bait* your *Door* with them, the effect will be this, The *Carps* will eat them as before, and withal fall a purging and scouring whatever is within them; and Consequently will be exceeding Hungry, so as to Bite at any thing; then Early in the Morning Bait your *Hook* (which should be strong and large) with your biggest *Beans*, and let the point of your *Hook* but just pierce the skin of your *Bean* (but note that the *Beans* wherewith you *Bait* your *Hook*, must not be of the bitter ones) your *Hook* must have a *Foot* of *Line* to Trail on the *Water*; and your *Line* should be made of Green Silk, with a Device to let go store of it as you see occasion. When you perceive your *Float* to *Sink*, then strike him, but upright not slanting; and when once he is hit, let him have *Line* enough to tire himself. In like manner you should be very careful in Landing him, for many a goodly Fish hath been lost by overhastiness, to prevent which you may use a Comodious *Net*, which may serve for other Conveniencies, I shall here insert the *Figure* of it.

This



This *Net* is to be extended on a Forked *Stick*; the two Branches *N*, *O*, should be each two *foot* long, and from the End *N*, to the other End *O*, should be likewise two *foot* distance. The *Net P*, being tyed on, should be about two *foot* deep; when the *Carp* is within five or six *foot* of the Land, set your Foot on the *Line*, and gently put the *Net* under the *Carp*, and so secure him: One Man may manage three or four *Lines* at this Sport, provided they be near him, and well secured on your *Rods*, and your *Rods* well fixed on the Land with some Weighty things on the great Ends; and if you stuck a small Forked *Stick* into the Ground about a *foot* high, to support the Middle of your *Rod*, it were very secure, both for preventing the drawing of your *Rods*, and the *Carps* would then strike themselves.

I shall next give you two Receipts for *Paists*, which are most excellent and approved: Take a *Heron*, Plume him, then chop and mince him very small, and put it into a large strong *Glass-Bottle*, which stop very close, and bury in an hot *Dung-hill* for two or three Weeks, so that it may be brought to an *Oyl* by a through Corruption; keep your *Bottle* always well Corked: When you go a *Carp-fishing*, make up a *Paist* with Crums of *White-Bread*, some ground *Hemp-seed*, with this aforesaid *Oyl*; and with this *Paist* bait your *Hook* so Artificially as no part be discernable; the quantity of a large *Bean* is enough. Also with this *Oyl* anoint all that part of your *Line* next the *Hook*, and let your *Paist* rest a Foot on the Ground, as before directed.

The other *Paist* is more chargeable; but the excellency and goodness doth countervail the Cost, were it far greater: Take a Pound of the Dregs of *Hemp-seed* (by the Dregs is to be understood the bruised Body of the Seed, after the Oil is squeezed out) two Ounces of *Mummy*, or the Fat of a *Man*, which may be had at the *Apothecaries*; the like quantity of *Pork-Lard*, also two Ounces of the Oyl of *Herons*, the like quantity of *Honey*, one Pound of grated Crums of *White-Bread*, and four Grains of *Musk*; Make all these up into a *Paist*, and if you find it too stiff, mollifie it with *Honey*, and if too soft, thicken or stiffen it with the Dregs of *Hemp-seed*. You may roll it into *Pellets* of the bigness of large *Beans*.

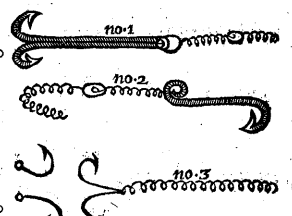
Carps Spawn in *May*, or *June*, after which they (as all other Fish) use to be very hungry, and will then for some time Bite at any thing.

CHAP. XI.

Directions for taking Fish by laying Hooks *and* Lines *in the Water, by Day or Night.*

HAving gone through that part of *Fishing* which relates to *Angling*, I shall now proceed to give you some other necessary Rules to be understood and practised in this Art, that you may thereby take divers sorts of Fish, as well by Day as Night, without being obliged to the continual Attendance, which the former part of this Discourse doth necessarily require: That is, the laying of *Hooks* and *Lines*, which are usually intended for taking of Fish. If you set them for the *Pike*, *Perch*, or *Barbel*, you should do well to keep your *Hook* and *Bait* about a *foot* from the Ground by the help of some *Cork*; but for *Eels* your *Bait* must lye on the Ground. You are to know, that besides the foregoing sorts of *Fish*, there are some others which are usually taken with the said *Night-Hooks*; for which you must prepare your Ground *Paists*, and your Hook *Baits*, according to the several Natures; all which is already treated of.

But whereas I have in the *Fourth Chapter* treated of *Hooks*, I hold it not amiss to supply here some few Omissions, which indeed were purposely there made, as conceiving them more proper for this place. This following *Figure* represents the exact Forms and Proportions of several *Hooks*, which ought to be used in this kind of *Fishing*, and to fasten them to Links of twisted *Wyer*, just as you see in the *Figures*, which are so plain, that there needs no further Explanation, unless of the last of them *Number* 3, which is framed by tying 2 single ordinary *Hooks* together in the manner as this is, for your help when you are in a place where you can't procure any of the former, as sometimes it so falls out.



There is a great Care required in Baiting these *Hooks*; for your Directions herein observe the manner of these following *Figures*.

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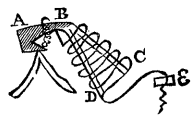


If you are to Bait your Great *Hook*, *No.* 1. take the first Link of the *Chain*, and put the End *P*, into the *Throat* of the Fish with an *arming Bodkin* made for that purpose, so as to come out at his *Gills X*, in *No.* 6. and then draw it close, that the *Hook* may rest at the beginning of the Mouth *V*; then fasten the Shank of your *Hook* with a Thread about the Tail of the *Fish*, as *G*, in *No.*4.; and then tye the other *Line*, or strong *Packthread*, well twisted at the last Link *K*, which said *Line* must be fastned to some strong *Stake*, *Root* of a *Tree*, or the like.

Observe that when you Bait with any live *Fish*, to have them preserved in the Water alive, and to move up and down on, and with your *Hook*, as long as possible. Now if you draw your *Hook*, or *Line*, quite through them, they will immediately dye, and consequently are but dull Invitations to Fish. Let your great care therefore be to preserve your *Bait-fish* strong and lusty, and hurt him as little as possible.

By the Directions given you in Baiting the *Hook*, *No.* 4. you may soon learn how to do that, *No.*5.

Young *Carps* are the best Baits for *Pikes*, or *Barbels*, for they will live long in the Water. If you *Bait* with a *Perch*, cut off a good part of his *Back-fin*, for when he bristles that up (as his custom is when any *Fish* of *Prey* comes near him) it will hinder the *Fish* from Biting.

Be careful in what places you lay your *Night-Hooks* in regard of *Stumps*, *Roots*, or the like; for when once a *Fish* of great strength finds himself Hooked, he useth to entangle all, that he may break some part of the *Line*, and so escape, which oft times proves successful to him.

For *Pikes*, and the like, lay your *Hooks* in the midst of the Stream, in *Ponds*, and other places; for *Eels* by the Bank-sides.

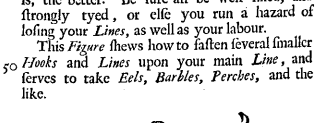
When you cast in your *Baits*, as *No.* 4. have your *Line* folded up as you there see, with a piece of light dry *Wood* bored through the middle, as *L*, and that you should place some three or four *foot* from your *Bait*, more or less, according to the depth of the Water; but if you made the said *Float* of a small bundle of *Rushes* loosly bound up, it were better, and would not fright the *Fish*. In *Summer* you should have all your *Hooks* laid between three and four of the Clock in the Afternoon; in *Winter* an hour or two earlier, and both *Winter* and *Summer*, visit them about eight or nine in the Morning.

You must not set your *Night-Hooks* in the same manner in Runing *Streams*, and swift *Rivers*, as you do in standing *Ponds*, and deep silent *Pools*; for you must in *Rivers* and *Streams* tye a small *Stone* of about four *Ounces* weight, two or three *Yards* from the *Hook*, the Letter *N* in *No.* 5. shews it, by which means your *Bait* may swim about a *Foot*, or fifteen *Inches* clear from the bottom.

If you set *Night-Hooks* in *Rivers*, have a *Boat*; for it is very difficult to cast your *Lines* off from the Land in such direct places as is necessary. If the Sides of the *River* where you intend to lay your *Night-Hooks* be deep, then you may carry on your design well enough without a *Boat*, and in such places you may use the manner, as *No.*7.

You must provide so many Forked-Sticks as you intend to set *Lines*. The Letters *A,B, C, D*, represent the Form. From *A*, to *C, D*, let there be a distance of four or five *Inches*, in this manner. From *A*, to the Twist or first beginning of the two *Branches*, let there be about two *Inches*, from thence to the end of each Branch about three *Inches*; the very Ends of the two Forks must be cleft to receive your *Line*, as hereafter. At *A*, make a Notch to fasten a small *Cord* of about two *foot* long, which *Cord* tye to some *Tree*, *Stake*, *Stump*, or the like, to hold all sure. Fasten the End of the *Line* at *B*, and fold the rest about the two Branches in and out, as you see by the *Figure*, until within eight or ten *foot* of the *Hook*. At *E*, place a piece of *Wood*, or bundle of *Rushes*, together with a *Stone*, *&c.* of both which I have just before treated; then pass your *Line* into one of the *Clefts* at the End of either of your *Forks*, and that will hold it firm until some good large Fish be caught, who having bitten and swallowed the *Bait* will presently change place, imagining all is well; but finding he is surprized will begin to plung, and to draw out your whole *Line*; and the longer it is, the better. Be sure all be well fixed, and strongly tyed, or else you run a hazard of losing your *Lines*, as well as your labour.

This *Figure* shews how to fasten several smaller *Hooks* and *Lines* upon your main *Line*, and serves to take *Eels*, *Barbles*, *Perches*, and the like.



Your *Hook* should be small, and Baited some with *Minows*, some with *Frogs*, some with *Worms*, others with pieces of Powdred *Beef*, and the like

like; you may fasten particular *Lines*, about two *foot* distance from one another; the smaller *Lines* being each about two *foot* long. Every thing being so disposed, tye the End *B* fast to some *Stake*, *Bough*, or the like, the other End *A*, fasten to some heavy *Stone*, which throw into the *River* as far as you design. Your *Lines* and *Baits* hanging thus cross the Water, no *Fish* can pass by without seeing them, and be sure to lay these kind of *Lines* in places free from *Trash*, *Roots*, or the like; for the great *Eels* will else endanger all by twisting themselves and the *Lines* about the *Weeds*, *Roots*, or *Stumps*.

It is good to lay some Ground *Baits* which may draw small *Fish*, and those will attract great ones, for which this said Device is chiefly intended.

CHAP. XII.

Of Night-Angling, and Ground-Angling.

GReat *Fish* (but chiefly *Trouts*) are shy and fearful of Ensnarements, and do observe the most secure Seasons to seek their *food*, which is at Night.

In *Night-Angling* you should be provided with some great *Garden-Worms*, or instead thereof with *Black-Snayls*, with these *Bait* your *Hook*, and cast them off a good distance, and draw your *Line* to you again upon the surface of the Water, not permitting the *Bait* to sink, to which use not a *Plumet* of *Lead*, but only a *Float*; whereas in *Ground-Angling*, you must use a *Plumet* without a *Float*; and this sort of *Ground-Angling* is very good in Cold Weather, for then the *Fish* lye low. You may easily hear the *Fish* rise, and therefore give him time to swallow the *Bait*, and then gently give him a twitch to secure him. If you find that the *Fish* will not freely take the *Bait* at the Top of the Water, then sink your *Bait* by putting thereto some *Lead*, and order your self as at *Day-Angling*. It is observed that the best *Trouts bite* in the *Night*, and do most commonly rise in the still Deeps, seldom in the quick Streams.

CHAP. XIII.

Directions for taking and preserving Worms, very useful in Angling.

WORMS of all sorts are very necessary, as well for *Night-hooks*, and *Nets*, as *Angling*, or the like; they are not at all times to be had on a sudden, nor without labour and industry. I shall here shew you some ways to furnish your self therewith at all times. If you be in any place where you suppose *Worms* are, the way to get them out of the Ground is to keep a continual motion with your *Feet*, by moving up and down in one small tract of Ground, and the *Worms* hearing the noise will work themselves out round about you; then being provided with a Stone Pot put them therein, and so order them as already directed, and keep them for your use.

If in the Summer time, you take about a quart of *Green-Walnuts* with the *Husks* and *Shells*, beating them in a Pottle or two of Water, with some *Brick*, or *Tyle*, the Water will be come bitter, which being sprinkled on the Ground so as to soak into the Earth, will presently cause the *Worms* to come out of the Earth. If you take a strong Stake, and drive the small End about a *Foot* into the Ground, and then settle your self to pull it out, not stiring your Feet from the place, but continue this kind of motion for a bout a quarter of an hour, all the *Worms* that are within a Fathom round you; hearing the noise will come up.

Another way is thus; Take a *Candle* and *Lanthorn* that hath clear *Horns*, and being provided with an *Earthen Pot*, in a dark Night go into the *Walks* of your *Garden*, or else into such Lands that are in *Tillage* and free from *Grass*; you must walk softly, and stooping downwards you may perceive the *Worms* half out of the Ground, not only to enjoy the Fresh Dew, but also to Couple, and thus all Summer long you may find such places full of them from an hour after *Sun-set* to near *Day-Break*, especially after a Shower of Rain, and in Winter the same upon a warm Thaw after a *Frost*.

Having shewed you to take *Worms*; I shall proceed to instruct you how to preserve and keep them all the Winter. About *November* when you see any *Husbandman* breaking up a piece of *Lay-Ground*, if you follow the *Plough* you will find good store of small whitish *Worms*, some call them *Grubs*; they are bred of the *Eggs* of a *Beetle*, which she leaves in Holes under *Cow-Turds*, or *Horse-Dung*; these *Worms* in *March* and *April* become Red, and not long after grow to be *Beetles*. If you gather two or three thousand of them, and put them into a large *Tub*, with about two *Bushels* of the same *Earth* from whence they were took, and keep it well secured from cold *Blasts*, and *Frosts*; they will live all the *Winter*, especially if you give them a little fresh *Earth* once in about a Fortnight. A Day before you use them, take so many out as you think to use, and let them be put apart into a little fresh *Earth* moistned with *Honey*, and they are excellent *Baits*.

Gentles are thus bred and preserved: Take a piece of a *Beasts-Liver*, and with a Cross-Stick hang it up in some place over a *Barrel* half full of dry *Clay*; they will fall into the *Barrel*, and there scour themselves. You may breed them in this manner, until the Middle of *October*; but if you would breed them to keep all Winter, get a dead *Cat*, *Kyte*, or the like, and let it be

Fly-

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Fly-blown; when you perceive the *Gentles* begin to ſtir, bury the *Carkaſs* in ſome moiſt *Earth*, where it may remain as free from the *Froſt* as you can. You may make uſe of them at any time all the Winter until *March*, and then they begin to turn to *Flies*.

CHAP. XIV.

How to take Eels *with a Speer, or Darting-Rod, much uſed in* Flanders *and* Holland.

IN *Flanders* and *Holland* they take *Eels* in great abundance, with the help of a *Dart*, or *Striking-Iron*; this *Figure* repreſents the faſhion thereof, and its uſe I ſhall here explain.

The *Iron*, or *Steel*, muſt be about a quarter of an *Inch* thick all over, and in the End muſt be a Socket to receive the End of a good ſtrong *Pole*, the Letter *L*, denotes the *Socket*, *K*, and *L*, the *Pole* which ſhould be about fifteen *foot* long, and muſt be faſtned into the *Socket* with a couple of *Iron-Pins*, to take off, and put on when occaſion ſerves. The *Iron*, or *Steel*, muſt be framed into a Fork with three Teeth, as the *Figure* preſents, marked *N*,*O*,*P*, each above nine *Inches* long, the two outermoſt *N*,*O*, bending outwards, and the middlemoſt muſt be pointed like an *Adder's-Tongue*, a little rounding; and all three muſt have ſmall *Teeth* within, and the whole encompaſſed by an *Iron-Band*, or *Hoop*, that neither of them may ſtir out of his place, as you ſee the Letter *M*. The *Teeth* of all muſt be ſo cloſe, that a ſmall *Eel* can't paſs between; but towards the End *P*, you may leave them a little wider. The manner of uſing this Inſtrument is eaſie, being only to poach and ſtir with it up and down in ſuch Muddy places as *Banks*, and *Bottoms*, where you ſuppoſe they are; and if there be any, you can hardly miſs of them.

CHAP. XV.

How to take Frogs *in a Dark Night, by Torch-Light, uſeful for Baits.*

FOr the taking *Frogs* in the Night with *light*, there muſt be in Company three or four; one muſt carry *Bundles* of dry *Straw* to make the Flame, for the *Frogs* will not fail to make towards it. If it be a good big *Torch* it is much better, eſpecially if *Wax*; you muſt not make any Noiſe, but ſtand ſtill, and let them come about you in the *Water*; then for the taking them, each Perſon ſhould be provided with a Bag put between his *Legs*, with the upper part of the *Sack* faſtned to his *Codpiece*, and he may hold the *Sack* cloſe with one Hand, and put them in with the other; and ſo take either Great or Small, as you ſee occaſion; and if you be ſilent, they will not forſake the light.

CHAP. XVI.

A Pleaſant way to take Pikes, *called Huxing of the* Pike.

IF you are minded to ſee excellent ſport, chooſe out ſome *Pond* or *Pool*, where you are aſſured *Pikes* of a large ſize are, and ſuch as have good ſharp Appetites. Then take thirty or forty *Bladders* the largeſt you can get, blow them up, and tye them cloſe and ſtrong; then at the Mouth of the *Bladder* tye a *Line*, longer or ſhorter according to the depth of the *Water*; at the end of the *Line* faſten your Armed *Hook* Artificially Baited; and put them into the *Water* with the advantage of the Wind, that they may gently move up and down the *Pond*. When one Maſter *Pike* hath ſtruck himſelf, it is a moſt pleaſant Diverſion to ſee him bounce about in the *Water*, with the *Bladder* at his *Tail*; and when you perceive him almoſt ſpent, take him up. The ſame Diverſion may be done by tying your *Lines* and *Baits* at the Legs of *Geeſe* or *Ducks*; but the Geeſe that have been once ſo ſerved, will be afraid to come near the *Water* for a good while after, according to the Proverb, *Hang a Dog in a Crab-tree, and he will not care for Verjuice.*

CHAP. XVII.

Obſervations concerning Nets, *very uſeful in Fiſhing.*

THe next thing ſhall be to Treat of the taking *Fiſh* with *Nets*; and by the way 'tis not amiſs to give ſome few Directions concerning the *Making*, *Buying*, *Fitting*, and *Preſerving* them; not that I intend to inſert the *Art* of making *Nets*, but only to give ſome neceſſary hints; nevertheleſs take notice, that one Home-made *Net* will out-laſt three Sale ones, and yet not coſt the tenth part ſo much; beſides, with good uſage it will do three times the ſervice; and without *Nets* you can be no *Fiſher*, or *Fowler*, which

which are two delightful Country Divertions. The charge, or Difficulty of making them is eaſy, for almoſt every *Barber* is a proficient therein, and for the expence of about five *Shillings*, you may be provided with all Inſtruments and Tackle neceſſary to be uſed therein.

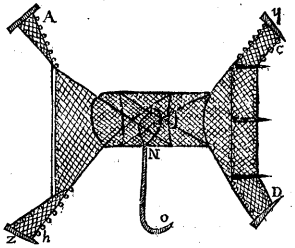
Now taking it for granted, that you will learn this eaſy and cheap Slight of *Net-making*, I ſhall proceed to ſome Directions how to preſerve them, in which obſerve eſpecially theſe three Cautions, First, that you *Dye* them into good *Colours*, wherein there is a double Advantage, as not frighting the *Fiſh*, which white ones are apt to do; and they will laſt ſtrong and ſound much longer. Secondly, that you mend them upon the leaſt Breach, for which end you ſhould always have your Implements about you, when you go to *Fiſh* with them; and Laſtly, that you lay them well up, which conſiſteth in theſe two things, firſt, that you carefully dry them after uſage, and ſecondly that you keep them from damp *Walls*; and ſuch places where *Rats* and *Mice* may anoy them; to prevent which, keep them in ſome cloſe *Preſs*, or let them hang down from the middle of ſome Beam remote from any *Wall*, as tyed thereto by a *Cord*.

For the *Dying* of *Nets*, there are but theſe Colours proper for *Fiſhing*, viz. *Green*, *Tellow*, and a *Sad Ruſſet*, the latter is effected by the help of ſome *Tanners Vate*, which is a great preſerver of them; and in caſe you have not that Conveniency, take about half a *Buſhel* of the outward *Rind* or *Bark* of a *Walnut-tree*, and cut it into ſmall pieces, then Boyl them in a reaſonable quantity of fair *Water* about two Hours, then take it off the Fire, and put your *Nets* into the bottom of the *Veſſel*, laying the *Bark* upon them, and ſo let them lye a Day and a Night to Infuſe; and when you take them out, they will be a good brown. The *Tellow* is made by rubing over the *Nets* with *Celandine* well bruiſed, ſo that the Juice may ſoak into the Thread; And the *Green* Colour is made by Boyling young *Wheat*, *Barly*, or *Graſs* chopt ſmall, and let the *Nets* lye a Day and a Night in the ſaid Liquor. But if you would be at the charges, it were better to have them done by a *Dyer*.

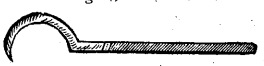
CHAP. XVIII.

Directions for pitching a Net *called the* Raffle, *both by Day and Night.*

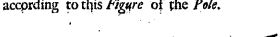
THe firſt *Net* that I ſhall take notice of, is called a *Raffle Net*, tis to be ſuppoſed from hence, that nothing can eſcape it, when once gotten in. The *Form* thereof is here preſented unto you, whoſe uſe I ſhall next deſcribe.



You muſt be provided with five or ſix *Poles* of *Sallow*, or ſuch light Wood, which is ſtrong withal, and each of nine or ten *Foot* long, but more or leſs according to the Depth of the *Water*; at the great End ſharpen them, the better to be fixt into the Ground at the bottom of the *Water*. You muſt alſo be provided with a *Paring-Knife* to cut away all *Weeds*, *Roots*, *Stumps*, *Boughs*, or the like, which are in or near the places where you deſign to pitch your *Net*, for them you muſt remove out of the way. The *Figure* of the ſaid *Paring-Knife* is here deſcribed.



Then faſten one of your *Poles* at either end of your *Net*, at either of the two *Wings*, that is to ſay, the *Cord* below where the Lead is, unto the bigger End of your *Pole*, and upper *Cord* where the *Cork* is to the ſmaller End of the *Pole*. Then in caſe you have no *Bait*, contrive to get ſome Man on the oppoſite ſide of the *River* with a *Cord* in his Hand, one end whereof muſt be faſtned to one of the *Poles*, which are fixed to the *Net* according to this *Figure* of the *Pole*.



The Man having drawn over that Wing, muſt force the great end *A* of the *Pole* in the ſaid *Net* into the Ground at the bottom of the *Water C*, the like muſt be done with the other *Pole* of the ſaid *Net* marked *Z*, *b*, on the ſide, juſt over againſt the former.

Then muſt he throwover one End of the *Cord*, which faſten to the Wing of the ſaid *Net*, *y*, *C*, when it is drawn over, you muſt go along the whole length of the *Net*. Your *Poles* being ready faſtned as the two former, and ſtreigning the *Cords* of your *Net* indifferent ſtiff, drive the two latter *Poles* into the Ground as you did the two firſt. Be ſure all be well and ſtrongly done, that the Current may not force away your *Supporters*, then with the ſaid long *Pole* you may ſpread the Graſs and Traſh you formerly pared away all over the *Net*, as well to ſecure it from the ſight of *Thieves*, as to give a ſhade to the *Fiſh*, for they covet ſhelter, eſpecially in

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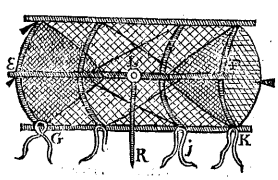
hot Weather. The *Cord N, O*, is your *Lock* and *Key*, for by it you are ſure no *Fiſh* can eſcape that are in your *Net*, therefore be careful to hide it. You may let the *Net* ſtand a Day and a Night, and if the place be well ſtored with *Fiſh* you will hardly miſs them. But if you deſign to *Fiſh* only by Day, and not to let the *Net* lye in the Water, then after the *Net* is planted, let a couple of Men beat up and down with long *Poles*, taking a good Circumference; and beating towards it about the ſides of the *Water*, ever now and then thruſting their *Poles* into the bottom of the *Water*, and when you are minded to draw, be ſure in the firſt place to ſtrain in the *Lock* and *Key N, O*, and then having a *Cord* at each Wing of the *Net*, from the other ſide draw them both at once gently towards you; and when they are near at Hand together make what haſt you can, and thus you may make ſeveral ſets in a Day.

CHAP. XIX.

Directions for pitching a Net *called the* Wolf, *together with its Form.*

The next ſort of *Net* that I ſhall Deſcribe is called the *Wolf*, being a great deſtroyer of *Fiſh*, as well in *Rivers* as *Ponds*, and may not unfitly be called the little *Raffle*, as exactly the ſame, except the four *Wings*, the Figure followeth.

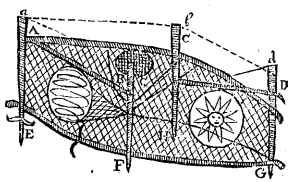


You muſt carry this *Net* to the *Water-ſide*, near the place where you intend to pitch, which to do well, ſhould be ſome Ground full of *Ruſhes, Sedges*, and ſuch like Water-graſs. Then with your Parcing *Knife* aforeſaid quarter out a place for the *Net*, by cleanſing away all the *Traſh*, and Weeds near it, the larger the better; eſpecially if you did cut two Alleys in a direct Line, a pretty length, one to each ſide of the *Net*, by which the *Fiſh* might be invited, and as it were guided unto the *Net*, at the two Doors *E*, and *F*. Then get four Stones each of five or ſix pound, which tye to the *Cords* marked *G, R, i, K*, which *Cords* faſten to ſome ſtrong *Staff*, as by the ſaid *Figure* is Repreſented. About the middle of the *Pole E*, faſten a *Cord L, R*, of a convenient length, whereby to draw the *Net* on Shore without being neceſſitated to go into the *Water* for it, though poſſibly you were forced to do ſo when you placed it there, which do in caſe you ſet the *Net* in the middle of any wide *River*: But if you place it within ten or twelve *Foot* of the Bank, you may then caſt in your *Net*; and ſetteſe it afterwards according to your Mind, by the help of ſome long *Pole* or the like, though the former muſt be confeſſed is the better way, but more Troubleſom.

CHAP. XX.

Directions for pitching a Net *called a* Cinque-Port, *and its uſe.*

This *Net* is ſo Termed from the five Entrances into it, and is of excellent uſe for any *Pond* or *River*, Swift or Standing Water. The *Figure* here followeth.



For the making uſe of this *Figure* be provided with four *Poles*, which muſt be ſtraight and ſtrong, and for the length anſwerable to the Depth of the *Water*; the great Ends muſt be ſharpned like *Stakes*, and notched within a *Foot* of the ends to faſten the four Corners of the *Net*, as *E, F, G, H*, the like Notches make on the ſame *Poles* at a convenient Diſtance for the faſtning the four upper Corners in the ſame manner, as *A, b, C, D*. The Bottom of the *Net* is four Square without any Entrance; to do well you ſhould have the help of a *Boat*, when you place the *Net* in the *Water*, for that you muſt drive your *Poles* faſt into the Ground; and at ſuch a convenient Diſtance, that your *Net* may be ſtiff ſtretched out, each *Pole* anſwering his fellow in an exact direct *Line*, and this may ſuffice in any ſtanding *Water*; but if it be in a ſwift Stream, the Motion of the *Water* will always move the *Net*, and ſo frighten away the *Fiſh*, to prevent which uſe this help; faſten at the very top of the four *Poles*, certain ſtrong *Sticks* to ſtreighten and ſtrengthen one another, and to keep all light; as for Example, obſerve the ſame pointed *Line* marked with little *a, b, c, d*, and you will eaſily comprehend it: But then if you faſten two other *Poles* croſs ways from *A, a*, unto great *D*, and little *d*, and from *C, c*, to great *B*, and little *c*, you need not fear it, for the *Water* can have no power over it.

CHAP. XXI.

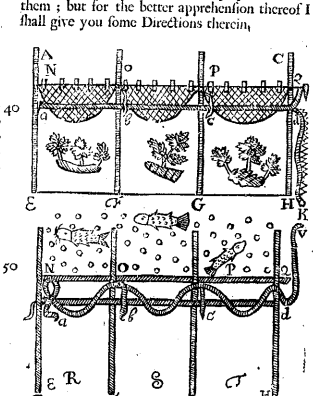
Inventions to draw or force Fiſh *into ſuch* Nets *as you ſet.*

Before I proceed further in the Diſcourſe of ſetting and laying of *Nets*, I hold it neceſſary to preſent you with ſome Directions for the Attracting by fair means, or frighting by violent ones the *Fiſh* into your *Net*. You muſt know that *Fiſh* (as moſt other Creatures) do delight in the Company of thoſe of their own kind, ſearching after each other, except the *Pike* that takes no pleaſure in his Companions, unleſs to eat them, and therefore is moſt eaſily taken; the like is the *Tench*, not upon the ſame reaſon, but becauſe he is always Hungry, which compells him to hunt up and down expecting to get his Prey, neither is he afraid of the *Net*, as moſt other *Fiſh* are. It is moſt certain that if when you ſet your *Net*, you put ſome live *Fiſh* into it, or for want thereof a piece of ſome Dead one, it will draw others to it: It is alſo certain that if you put into the *Net* any freſh coloured *Flowers* of divers ſorts, either the ſmell or ſight will invite them to it. But if you Bait your *Net* with a live *Fiſh*, let it be once taken out of the ſame *River*; and if you can come near the ſame place where you pitch, for *Fiſh* do know and are acquainted with each other, as well as any other ſorts of Creatures. If you hang in the *Net* a *Bone* of ſome ſalt *Pork* without any Fleſh it will Attract *Fiſh*. The *Dreggs* of *Hempſeed*, that, is the Refuge after the Oyl is extracted out, is a very great Attractive of *Fiſh*; But of all others *Paiſts* for *Nets*, and to ſay Truth for a *Ground-Bait*, on any occaſion this following one is the beſt. Take a *Leveret*, or young *Hare*, let it begin to ſmell ſtrong, then roaſt it with a gentle Fire, and baſt it well with *Honey*, when it is half Roaſted, put in the *Dripping-pan* Sippits of White Bread; and let it drop thereon till the Bread be well ſoaked, then take them out of the *Pan*, and put in more; and ſo continue untill all the liquor be dryed up. If you tye a piece of this Bread with a little of the *Fleſh* upon any part of the *Net* within ſide, it will draw the *Fiſh* to them in great plenty.

CHAP. XXII.

A Device to take ſtore of Fiſh, *at one Draught, and that in difficult places, by reaſon of* Rocks, Roots, Stumps, Holes *and the like.*

In ſuch *Ponds* and *Rivers* that are peſtered with *Weeds, Stumps* of *Trees*, great *Stones*, and the like, there *Fiſh* uſe to ſhelter themſelves from the extremity of Heat, as well as [illegible] likewiſe to ſecure themſelves from the Snares and ſurprizes of ſuch as deſign to take them. In ſuch places *Fiſh* grow fat and large. You muſt therefore be at ſome pains and charges to prepare the place; but the beſt of it is, that being once fitted, it will coſt nothing to repair. Cleanſe ſome part of the ſaid Ground of all the aforeſaid Trath and Impediments, for a good ſpace, both in length and breadth, and then Bait the middle thereof with the boyled *Beans*, as directed in the latter end of the Ninth *Chapter*. The ſame Day that you caſt in the ſaid *Ground Bait*, drive certain *Poles* into the Ground under the Water, according to the ſubſequent Direction. Theſe enſuing *Figures* do preſent the manner how to employ and order them; but for the better apprehenſion thereof I ſhall give you ſome Directions therein,



Get a certain number of *Poles*, each as big as a Mans Arm, ſtraight, and of ſuch length as the depth of the place requires; the greater Ends whereof muſt be ſharpned the better to be drove into the Ground; plant them at equal diſtances on the border of the *Plat-form* croſs the Water as *E*, another at *F*, about Ten or Twelve *Foot* diſtance, and ſo at *G*, and *H*. In like manner oppoſite

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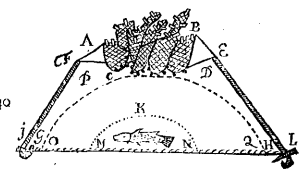
posite to these fasten as many others on the other side of your *Platform*, which *R, S, T*, doth denote, the said *Poles* being obvious by the letters *E, F, G, H*, the same with the foregoing: Then pierce all the Stakes at the top just level with the *Superficies* of the Water, with Holes large enough to receive certain *Pegs* as big as ones little *Finger*; which *Pegs* must slip in and out very easily; and at the biger end of the *Pegs* make a Notch for the snare, tying on a strong *Packthread* of about a *Foot* and a half long. Every one of the *Packthreads* must be fastned to a long *Cord*, as designed by the letters *a, b, c d*. The *Pegs* you may also discern to be fastned each in the Hole by the letters *N, O, P Q*. When you have thus far proceeded, cast in Morning and Evening Five or Six handfuls of your *Beans*, and the Evening before you *Fish*, cast in as many of those which are prepared with *Aloes*, and then set your *Nets* between Two and Three in the Afternoon, in this manner; Get a Pair of *Tramel Nets* long enough to encompass the whole *Platform*, or to speak truly, the whole River above and below, fasten the *Cork-Line* at *A, B*, and let the *Lead-Line* sink to the Bottom, then pass along by the *Poles E, F, G, H*, and strain over the *Net* to the other side of the *Poles C, D*, and there fasten your *Cork-Lines* and *Lead-Lines* in the same manner, Then strain your *Cord* for the *Pegs V, a, b, c, d, K*. tie one end thereof on the backside unto some Bough, Stake or the like, as *V*, distant from the *Pole N*, about Six *Foot*, then go with your *Boat* to the midst of the Water, and take your *Cork-Line* in the Left Hand, and lift up your *Net* until you have the whole in your Hand, that is to say, the *Cork-Line, Net*, and *Lead-Line* which place upon the *Peg O*, in the upper end of the *Pole F*, and so do unto every *Pole* one after another, until all your *Net* be so fixed. Then carry the other end of your *Cord* just over against the middle of the *Platform* where you cast in your *Ground Baits*, and fasten the said End on a *Stake*, as at *K*; and thus having done the one half, you are the better able to do the other, which is the same thing as before described, in which you cannot well mistake, the *Figure* being marked with the same Letters, though but one with the *Net* ready planted, the other being to direct you by the single *Cords*, *Pegs*, and the like; Then at Night cast in some more of the *Beans*, and about Nine or Ten of the Clock get Three or Four Men with you, whom you must divide, Two on the side of the River *A, B*, and the other on the side *C, D*, that you may have one at each End of your two *Tramel-Nets*, but they must go cunningly and quietly to work without noise, and keep at least Ten or Twelve *Foot* distance from the *Nets*, until the Signal be given by him who is to let the *Nets* go, who being at *K*, should get hold on both the *Cords* that hold the *Peg-Lines*, and giving them a good pluck, shall thereby give way to the *Nets* to fall down, and so encompass all the *Fish*, which are at your *Bait*, and within the circumference of your *Nets*, or just at the same time that your *Peg-Line* is drawn, the Signal must be given, and then must the Men bestir themselves to close in the Ends of the *Nets* next the Shoar, so that nothing may get out, and then are the *Fish* as it were in a Cage.

The next thing to be done, is to close in the Ends of your *Net*, and from beating from one End to the other, give no opportunity to the *Fish* to escape, but keep them in continual *Alarums* until you have drawn in your *Nets* close together, and so land them. You are to know, that it is to little or no purpose to pitch your *Nets* after this manner in any swift Stream, for that will hinder your *Nets* from resting on your *Pegs*, and will also prevent your *Nets* from playing as they should.

CHAP. XXIII.

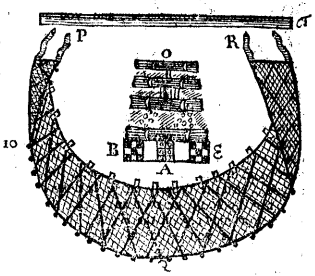
An Excellent way to take all manner of Great Fish *by Night, with a Net and Fire.*

IF you know any place frequented with *Fish* that are grown old and subtle, observe these following Directions: If the place be free from *Weeds*, and such like Impediments, it needs not be cleansed. This ensuing *Figure* doth represent the Draught to your view.



Suppose the *Pond*, or Place you design to Draw, be the Space marked within the pointed Line *O, P, D, Q*, and that *I, L*, be the length of the Banks-side which you would encompass; then Bait the place with some good *Paists*, as the boyled *Beans* with *Honey*, &c. for three or four days before you draw it; and if you cast in all your *Paists* near one Spot, it were the better; as for Example, within the pricked Line *K*. The Morning you intend to Fish, Bait with your *Purging Beans*, to make the *Fish* more hungry and eager to Bite. That Day about two in the Afternoon plant your *Net* in this manner, with the help of a *Boat* or long *Tub*; for want thereof go to the Verge of your *Plat-form*, as *P, D*, and then let drop your *Net* just in the Form, you see it delineated by the Letters *A, B, C, D*; that is to say, in a kind of Heap, yet so as it may be entangled by it self. At the End *E*, fasten a *Cord*, and fix the other End of the said *Cord* on the Shoar at *H*, on some *Stake*, or the like, and another *Cord* at the End *F*, whose End must be

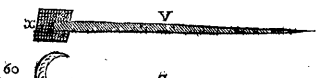
be fastned at *G*, about an hundred Paces distance from *K*, the place where you *Bait*, and the said place ought to be just in the middle between the two *Cords*, which are fastned at the two Ends of the *Net*; Then on the Land between *M, N*, just over against your *Baiting-place* leave a heap of dry *Leaves*, *Straw*, *Stubble*, or *Sticks*, which may quickly take Fire; then withdraw, and let not any more noise be made near the place that Evening. The Night being come, the old crafty *Fish* will be sure to peep out, partly to see what was the cause of the Noise, and partly through Hunger; The darker the Night is, the better: Then go three or four together, one must gently (without noise) go to the *Cord G*, and another to *H*, and there lye close until the Sign be given; then let one set Fire to his *Stubble* at *M, N*, as secretly and quietly as possible, and so lye flat on his Belly, to observe by his *Eye* and *Ear* if the *Fish* make a noise, or motion; if they do, let him cast in five or six handfuls of the *Beans*, as he lieth upon his *Belly*, but not the Purging ones, and lye close for about a quarter of an Hour, by which time the *Fish* will be all at work, some eating, and others looking on the *Light*; then give Notice by a Whistle to your Companions to draw the *Net* with all imaginable dexterity, inclining towards each other, that the *Net* may be extended like a *Semi-Circle*, as you see the Letters *O, P, D, Q*: When the two Cords of your *Net* are drawn, one to *O*, and the other to *Q*, then with their *Beating-Poles* let them lay on at Top and Bottom of the Water, to keep the *Fish* amused, that they may have no leisure or place to escape, so by little and little gather the two Ends close together to the place *K*; then take your *Lead-Lines* into your Hands, and let your Companions take each one of the *Cork-Lines*, and gently pull in your *Net*, yet so that your *Leads* may still graze close on the Ground, or else the *Fish* will get away under the *Net*, especially the great and crafty Ones.

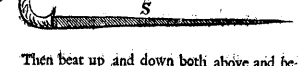


Suppose the Circuit *P, Q, R*, be the place designed for the *Fishery*; then provide about twenty large *Fagots*, bound at both Ends of about six *foot* long, and four *foot* about; lay four of them in a kind of a Square at the Bottom, but let there be about a *foot* space between every of them; then lay a Range on the Top, cross them, and a third Range over them until you have piled up *Fagots* almost to the Top of the Water; then lay some heavy *Stones* on the uppermost *Fagots* to keep all close and sure against the violence of the Water, in case it be a rapid Stream. It were not amiss, if you drove a strong *Pole* with an Iron-Point through the uppermost *Fagot*, and so through all that are directly under it, into the Ground, the better to support your *Covert*.

When every thing is thus fitted, do nothing for about a Fortnight, that the *Fish* that pass too and fro may have time to acquaint themselves therewith; when they find such *Holes* to receive them, with the benefit of the Retreat, they will much resort thereunto, especially the larger Ones.

When you intend to try what store there is, do thus: Get your *Tramel-Net* well Leaded at Bottom, and Corked at Top, into some *Boat*, together with an Instrument, being a long light *Pole* with an *Iron-Crook*, strongly fixed at the great End; and also be provided with *Beaters*, which are light long *Poles*, with Flat pieces of *Wood* nailed on the top of them, to make a noise on the Top of the *Water*, as also to thrust into the Bottom, thereby to drive in, and move on the *Fish*. The Figures of the *Poles* are as followeth.





Then beat up and down both above and below your *Warren*, yet drawing still nearer towards it, thereby to force the *Fish* to retire thither; then Draw about fifteen *foot* from your *Warren*,

CHAP. XXIV.

A Device to make a Fishery in any open River with Wants, Holes, and Weeds; to shelter the Fish *from great Heats, and extream Colds, in the nature of a Warren.*

THere is an ease and cheap way of preserving and storing *Fish* in the midst of any *River*, by making a *Warren*, as it were, for the *Fish* to retreat into; yet may you take them when you please. This *Figure* sheweth the Draught of the design.

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your *Stick* may ſtand upright on the three *Forks*. Alſo prepare a Dozen of *Rods*, or *Sticks*, about five or ſix *foot* long, cleft at the ſmall End, marked *I*, in which you may place ſome skin'd *Frogs*, the *Guts* of *Chicken*, or the like. When the *Sticks* are all Baited, go out, and where you find any likely Hole lay your *Stick* on the Ground, with the Baited End juſt at the Hole in the Water, and there leave it; and ſo after this manner lay the reſt in the moſt likely places, and walk in and out viſiting your *Sticks*, and when you find any fixed to the *Baits*, gently move your Baited End towards the middle of the Water, and doubt not but that the *Cray-fiſh* will keep their hold, and ſo put your *Net* juſt under the *Bait*; then ſoftly liſt up the Bait, and as ſoon as the *Cray fiſh* feels the Air they let go their hold, and fall into the *Net*.

It is moſt certain that about Five and twenty have been thus taken out of one Hole, all hanging at the ſame time upon one *Bait*; Conſider then what may be done in a well ſtored *River*, with about a Dozen *Rods* together. It is an excellent Diverſion, ſeeing that two or three Friends may diſcourſe Walking, and yet mind the work in hand.

CHAP. XXVIII.

Directions to take Pikes *as they lye Sleeping, and Sunning themſelves in fair clear Weather, the one with a* Net, *and the other with a* Runing-Knot *of Horſe-hair.*

I Suppoſe moſt covet the *Pike*, as being an excellent *Fiſh*; They are often found Sleeping in fair Open Weather, from *March* until *Auguſt*, on the Top of the *Water*, and near the Land; they are thus taken. You muſt be provided with a long *Pole*, or *Rod*, that is light and ſtrait, on the ſmaller End thereof faſten a *Runing-Loop* made of well twiſted *Horſe-hair*, and *Silk*, of a large compaſs, which gently draw on him, and when you have it about five or ſix *Inches* over his *Gills*, then hoiſt him up; if it be a ſmall one draw not the *Collar* ſo far on, leſt he ſlip through: Make no Noiſe in Walking by the *Bank-ſide*, but go gently without ſpeaking, and in caſe you find one in ſuch a poſture as that you can't conveniently draw your *Loop* on him, you may gently touch his Tail with the *Rod*, and he will turn himſelf as you would have him.

You may alſo take them by a *Net*, which is treated of in the latter End of the *Ninth Chapter*, touching the Landing of *Carps*, and other great *Fiſh*, to which I refer you as to the Deſcription thereof; and I ſhall here teach you how to uſe it in taking *Pikes*, as aforeſaid. When you perceive any one ſo Sleeping, put your *Net* into the Water as gently as poſſibly you can, and guide it juſt under the *Pike*, and ſo lift it up very ſoftly until you are ready to touch him; then give him a Liſt with all the dexterity you can, and you will ſeldom fail taking them.

CHAP. XXIX.

A Collection of ſeveral Artificial Baits, recommended by Authors of great Eſteem, that have been curious in Studying the Natures of Fiſh, *and the Art of* Fiſhing.

I Shall in this *Chapter* give you an Account of ſuch *Baits*, *Paiſts*, and compounded Attractions, as I have met with from divers Profeſſors of this Art; not that I will much recommend them, leſt they ſhould prove like thoſe *Medicines* for *Agues*, which may be a Cure to ſome, and fail in others.

Take *Coculus-Indy*, and *Aſſeſtidæ*, beaten and mixt, with a like quantity of *Honey*, and diſſolve it in the *Oyl* of *Polypody*, and keep it in a cloſe Glaſs, and if when you *Angle* you anoint your *Bait*, whether Natural, or Artificial, it will draw the Fiſh to it in great abundance.

Take ripe *Cherries*, and Stone them; then beat the Pulp thereof with Crums of *White-Bread* into a *Paiſt*, and if you caſt *Pellets* of it into the Water, it will entice the *Fiſh* to the place.

Take ſome *Blood*, ſome of the *Fat* and ſome of the *Dung* that is in the ſmall Guts of a *Sheep*; ſome *Thime*, *Penny-Royal*, *Organ*, *Savory*, *Marjoram*, *Garlick*, the *Lees* of ſtrong Sweet *Wine*, of each a like quantity; mix and chop them ſmall and well together, then make them into ſmall *Pellets*. Theſe *Pellets* being caſt into the Water will be ſure to draw *Fiſh* to them, if there be any ſtiring; and then with your *Nets* you may ſecure them.

If you take the *Blood* of a *Goat* and the *Lees* of ſweet ſmelling *Wine*, and therewith make a *Paiſt* with *Barly-Flowers*, it will alſo attract *Fiſh*.

If you anoint any *Lines* or *Nets* whith *Salt*, it will cauſe the Fiſh to avoid them.

Take of ſtrong ſtinking *Sturgeon*, and of the yellow *Butter-Flyes* each an Ounce, of *Anniſeeds*, *Hempſeed*, and *Cheeſe*, of each Four Drams, of *Hogs-Blood*, and *Galbanum*, of each the like quantity, and of the Juice of *Parſnipe* Two *Drams*; mix all theſe together with a little *Red Wine*, and make them up into *Pellets*, drying them in the Shade, and this is ſaid to be a very bewtiching *Bait*.

Take ſome of the Worms called *Glow-Worms*, and diſtil them in a *Glaſs-Veſſel*, or *Vial*, with Four Ounces of *Quick Silver*, ſtoping the *Vial* very cloſe, that nothing may get in or out; then

then put it into your *Nets*, when you *Fiſh*, and it will attract them.

Take *Nettles*, and *Five-leaved Graſs*, chop them ſmall; then mix ſome Juice of *Houſe-leek* with it, and rub your Hands therewith throwing the reſt into the Water, and if you then hold your Hands in the Water, the Fiſh will not forbear to come to them, and ſo you may take them.

Take *Heartworth*, and *Lime*, mingle them together, and throw it into any ſtanding Water, it will draw them thither, and cauſe them to be Intoxicated, ſo that you may take them floating on the Water.

It was the ſaying of a Learned Man, that *Baits* ſhould have four qualities; Firſt, That *Baits* ſhould be ſtrong-ſmelling to draw them to you though at a great diſtance, ſuch as *Oyl* of *Anniſeeds*, *Juice* of *Wild Parſnips*, or the like; Secondly, That *Baits* muſt be well Taſted, to invite the *Pallet* to eat them, ſuch as *Hogs-Blood*, *Cheeſe*, made of *Goats-Milk*, *White Bread*, yellow *Butter-Flyes*, &c. Thirdly, It muſt have an operating quality on the *Head*, ſuch as the *Lees* of *Wine*, *Strong-Water*, &c. And Fourthly, That *Baits* ſhould have a fumiferous quality, ſuch as is in *Marigolds*, which being eaten by them, will in a ſhort time Stupify them. But for this buſineſs there is nothing ſo exquiſite as *Coculus-Indicus*.

The Compoſition that *Cardan* hath highly commended, is this; Take a quarter of and Ounce of *Coculus-Indicus*, the ſixth part of an Ounce of *Coleworts*, and as much *Strong-Water*, an Ounce of *Cheeſe*, and Three Ounces of *Wheaten Flower*; beat all theſe together into a *Paiſt*, and ſo uſe it.

Take *Penni-Royal*, *Summer-Savory*, wild and ſweet *Marjoram*, of each Three Ounces; of *Frankinſence* and *Mirrh*, of each an Ounce, of dried *Barly* ſteeped in good *Wine*, half a Pound of *Hogs-Liver* roaſted, *Goats Fat*, and *Garlick*, of each a Pound, mince each by it ſelf; then make it into a *Lump*, and after into ſmall *Pellets*, and if you throw theſe *Pellets* into any place they will attract the *Fiſh* to them, and ſo take them with your *Nets*.

Take *Mutton Suet*, *Garlick*, Wild and Sweet *Marjoram* dried, *Thyme* of each a like quantity, ſtamp them together with Crums of *White-Bread* and *Wine*, and give thereof for a *Bait*; or you may make a *Paiſt* of *Wine*, *Lime*, *Old Cheeſe*, and *Rams Dung*, which will exceedingly Intoxicate all manner of *Fiſh*.

If you take of that *Medicinal Shell*, called by *Druggiſters*, *Unguis Odoratus*, *Cummin*, *Old Cheeſe*, *Wheat-Flower*, of each a like quantity; beat them well together with *Wine*, and make it up into *Pellets* as big as *Peaſe*; then caſt them into the Water, and ſuch *Fiſh* as eat thereof may be taken up with ones Hands.

If you make a Compoſition of *Ariſtolechia-Rotunda*, *Hogs Fat*, and *Lime*, it will greatly attract Fiſh, which having taſted, will ſoon cauſe them to turn up their Bellies.

I might have inſerted divers other *Receipts*; but theſe ſhall ſuffice, being enough for the purpoſe

CHAP. XXX.

Directions for preſerving Fiſh both in Ponds and Rivers from devouring Creatures, ſuch as Otters, Water-Rats, Herns, Coots, More-Hens Sea-Pies, &c.

BUt whilſt we are endeavouring to teach you the Art of Killing *Fiſh*, I hold it not amiſs to give you ſome Directions how to preſerve them from the deſtruction of ſuch Creatures as uſe to devour them.

Otters, and *Water-Rats* are great deſtroiers of *Fiſh*, eſpecially in *Ponds* and Freſh *Rivers*; the beſt way to kill them is by *Hunting* them with *Water-Dogs*, and *Otter-Hounds*; you may alſo ſet dead Falls for your *Rats* in *Holes* which they frequent, and for your *Otters* you may poiſon them in this manner. Lay near his *Retreat* (which is eaſily found out) a *Bait* of an *Eel*, prepared which *Arſenik*, in this manner; Slit the back of the *Eel* above the *Navel*, and dexterouſly put into the Slit Three or Four Crums of *Arſenick*; then place the *Eel* from the *Navel* upwards out of the Water, the reſt to be under the Water, having firſt ſowed up the Slit. Now it is the property of the *Otter* to eat to the *Navel*, and ſeldom further; and you may be ſure it will deſtroy him. You may alſo deſtroy the *Otter* with a *Wheel*, which is ſo ordinary and well known, that the naming it is ſufficient. Yet I hold that the *Wheel* made with a double *Tunnel* is better than the ſingle one.

The *Herns*, *Sea-Pies*, *Cootes*, *Mews*, *More-hens*, and *King-Fiſhers*, are great deſtroyers of *Fiſh*, eſpecially the young Fry; you muſt therefore be provided with *Hooks* and *Lines* baited proper for them, alſo with *Lime-Twigs*, *Springes*, and with a *Gun*, for all which you will find ſufficient Directions in the Treatiſe of *Fowling*.

CHAP. XXXI.

Directions for making of Ponds, *and ſtoring them, &c.*

NOw concerning *Fiſh-Ponds*, and the making them, theſe Directions are neceſſary to be obſerved. Thoſe Grounds are beſt which are full of Springs, and apt to be Moriſh, for the one will breed them well, and the other will preſerve them from ſtealing. You are likewiſe to conſider the Situation of the *Pond*, and the Nature of the Currents that fall into it; likewiſe that it be refreſh't with a little Rill, or with the

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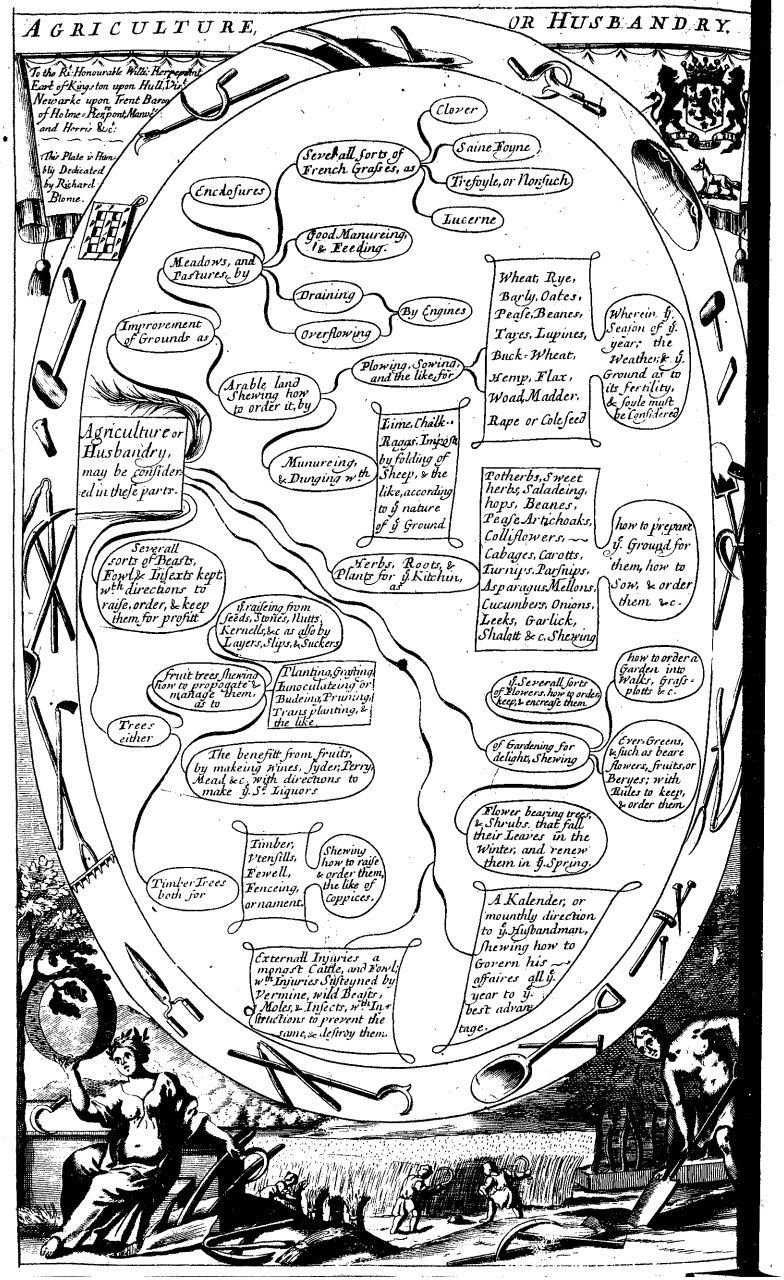
AGRICULTURE, OR HUSBANDRY.
To the Rt. Honourable Willm Herr. now Earl of Kingston upon Hull, Visc. Newarke upon Trent Baron of Holme Hesp. Manufr and Horn &c.
This Plate is Humbly Dedicated by Richard Blome.
Agriculture or Husbandry, may be consider ed in these parts.
Meadows, and Pastures, by
Enclosures
Several all sorts of French Grasses, as
Clover
Saine Foyne
Trefoyle, or Nonsuch
Lucerne
Good Manureing & Feeding.
Draining
By Engines
Overflowing
Improvement of Grounds as
Arable land Shewing how to order it, by
Plowing, Sowing and the like, for
Wheat, Rye, Barly, Oates, Pease, Beanes, Tayes, Lupines, Buck-Wheat, Hemp, Flax, Woad, Madder. Rape or Coleseed
Wherein ye Season of ye year; the Weather; & ye Ground as to its Fertility, & soyle must be Considered
Lime, Chalk, Ragas, Insects by folding of Sheep, & the like, according to ye nature of ye Ground
Manureing, & Dunging with
Several sorts of Beasts, Fowl & Insects kept with directions to raise, order, & keep them for profit
Herbs, Roots, & Plants for ye Kitchin, as
Potherbs, Sweet herbs, Saladeing, hops, Beanes, Pease, Artichoaks, Colliflowers, Cabages, Carotts, Turnips, Parsnips, Asparagus, Mellons, Cucumbers, Onions, Leeks, Garlick, Shalott &c. Shewing
how to prepare ye Ground for them, how to Sow, & order them &c.
Fruit trees Shewing how to propagate & manage them, as to
Trees either
Planting, Grafting, Inoculateing or Budeing, Pruning, Transplanting, & the like
The benefit from fruits, by makeing Wines, Syder, Perry, Mead, &c. with directions to make ye St. Liquors
Timber Trees both for
Timber, Vtensills, Fewell, Fenceing, ornament.
Shewing how to raise & order them, the like of Coppices.
Externall Injuries & mgmt of Cattle, and Fowl, with Injuries Sustayned by Vermine, wild Beasts, Moles, & Insects, with Instructions to prevent the same, & destroy them.
how to order a Garden into Walks, Grass-plotts &c.
of Several sorts of Flowers, how to order keep & encrease them
of Gardening for delight, Shewing
Ever-Greens, & such as beare flowers, fruits, or Beryes; with Rules to keep, & order them.
Flower bearing trees & Shrubs that fall their Leaves in the Winter, and renew them in ye Spring.
A Kalender, or mounthly direction to ye Husbandman, Shewing how to Govern his affaires all ye year to ye best advantage.

AGRICULTURE, OR HUSBANDRY.

PART VI.

Treats *of the* Improvment *of* GROUNDS, *by* Enclosures, Draining, *and* overflowing *by* Engines. *By good* Manuring, Tillage, Feeding, &c. *with the benefit arising by the* Trefoyl, Sainfoyn, *and* Clover Grass, *shewing their* Nature *and for what* Ground *most fit. Of* GARDENING *for* delight *and* profit, *as the* Raising, Sowing *and* Setting *of* Seeds, Plants, *and* Flowers. *Of* FRUIT-TREES, *and how to* Raise, Graft *and* Inoculate *them; with the benefit accrewing thereby; as also by* Timber *and other* Trees. *The several sorts of* BEASTS, FOWL, *and* INSECTS *necessary to be kept, and how to breed and order them; With a* KALENDER, *or* Monthly Directions *necessary to be known by the* Husbandman.

CHAP. I.

The INTRODUCTION.

AGRICULTURE was of so as high an Esteem, and held so Honourable in Former Ages, that the *Philosophers*; nay, *Kings* and *Princes*, were exceedingly delighted, not only in *Rural* or *Country Habitation*, but did also Exercise themselves in this Noble Art. Giving *Rules* and *Precepts* (which by their Writings they left to Posterity to their Immortal Fame. And the *Romans* had so high an Esteem for *Agriculture*, that they gave encouragment to the Industrious *Husbandman*; and punisht the negligent; And when they gave names to their *Tribes* called the cheefest of the States the *Rusticke Tribes*, and the meanest in degree the *Urbane*.

As to its Antiquity no *Art* stands in competition with it; for all know that the Country Life was the most Antient; for in the Infancy of the World, Men inhabited in *Tents*, *Woods*, and such like places, instead of *Houses*, and lived on the *Fruits* of the *Earth* by their Labour.

Plato saith, That a Country Life is the *Mistress*, and as it were the Pattern of *Diligence*, *Justice*, and *Frugality*, and that he could find nothing more pleasant and profitable, than a Country *Life*, where they live free from Pride, Malice, Covetousness and Ambition. And *Cicero* discourseing of the Utility of several *Arts*, concludes, that nothing is more advantageous and pleasant, nor more worthy an ingenious Spirit, than *Agriculture*.

Also *Attalus*, that rich *Asian* King, left his *Regal Dignity*, and betook himself to a Country Life, and was very intent in *Agriculture*, forming and planting several *Gardens*.

Likewise *Diocletian* the Emperour, left his troublesom *Empire*, and betook himself to a Country Life, and would not return to his *Empire*.

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Many more Examples might be inferted, but theſe together with the multitude of the like Preſidents which our Age and Country Affords, may ſuffice to convince any one of the Pleaſure, Dignity, Peace, Content and Utility of a Country Life

Agriculture is of a large *Latitude* comprehending not only all things that are produced from the *Earth*, as all ſorts of *Grains*, *Fruits*, *Herbs*, *Plants*, *Roots*, *Flowers*, &c. but alſo ſuch things that have their Nouriſhment from the Earth, as *Cattle*, *Fowl*, *Inſects* and *Fiſh*. Now the *Husbandmans* great Skil and induſtry is to be uſed for the Improvement of the Earth to bring forth her better encreaſe, and how to Breed and order *Cattle*, *Fowl*, &c. for the moſt advantage. Therefore having ſo ſpacious a Field to walk in, I ſhall with what brevity I can, treat of the moſt eſſential things, eſpecially thoſe that befit the qualification of a *Gentleman* to be a proficient in, omitting the *Ruſtick* part of *Plowing* and *Sowing* of *Ground*, as alſo the *Reaping*, *Mowing*, making and *Houſing* the *Corn* and *Hay*.

This Treatiſe for Method ſake ſhall be divided into ſeveral *Chapters*, and firſt of *Grounds* and the Improvement thereof.

CHAP. II.

Of Meadow and Paſture-Grounds and how to Improve them by Enclоſures, Draining, and overflowing by Engines. As alſo by Manuring and feeding them; with the great benefit ariſing by the Trefoyl, Sainfoyn, and Clover-Graſs, ſhewing their nature and for what Ground moſt fit.

Of ENCLOSURES.

Enclоſing of *Land* brings a very great benefit to the *Huſbandman*, and that in ſeveral reſpects.

Firſt, It aſcertains every Mans juſt Proportion of *Land*. Secondly, It prevents abundance of *Treſpaſſes* and *Injuries* between Neighbour and Neighbour. Thirdly, It gives great advantage for ſeveral ſorts of Improvement, as planting the *Hedgrowes* with *Timber* and *Fruit-Trees*, by enriching it with Crops of *Corn*, if converted to *Arable*, or by ſowing it with ſome of the new *French-Graſſes* as *Sain-foyn*, *Clover* or *Lucern*; by feeding it with *Cattle*, or Mowing it for *Hay*, which Improvements cannot be made in *Champain Countreys* that are deſtitute of *Enclоſures*. Fouthly, It is obſerved that the *Crops* of *Corn* are better than in open *Fields*; for if the *Hedgrowes* are tall, they keep the *Land* warm, and ſhelter it from thoſe pinching Winds that deſtroy much *Corn*; And the *Hedgrows* being well planted with *Trees*, give good ſhelter and ſhadow for *Cattle*, both in Winter and Summer. Fifthly, The *Hedgrows* are very profitable, affording Firing and Wood for the making *Plough*, *Carts* and the like neceſſaries; and Sixthly, the *Hedgrows* are profitable for *Maſt* for *Swine*, and for *Fruit* for *Sider* and *Perry*. All which reaſons being ſo demonſtrative, there needs no further Arguments to be laid down or perſwaſons uſed for *Enclоſures*. One thing more give me leave to add, that is, Enclоſed Grounds are far more pleaſant and delightful than the open *Champain*, and afford more diverſion.

In the making of *Hedgrows* theſe Cautions are to be obſerved; Not to plant *Trees* not naturally agreeing with the Soyl they were removed from; that is to ſay, not from a rich moiſt and worm Soyl, into a cold, barren and dry; not to plant them too deep, in the barreneſt Earth; To defend them from the external injuries of *Cold*, *Drought*, or prejudice of *Cattle*, which muſt be by fencing or enclоſing them in by an artificial dry Hedge on both ſides.

For *Hedges* the beſt are *Quickſet* of *Whitethorn*; and to ſet them on the flat is far better than on the ſide, if a dry Bank; as hath experimentally been found: Three *Rows* are ſufficient for a good thick Hedge; the richer the *Soyl* is, the better will the *Quick* grow, and the ſooner come to perfection. You muſt keep them free from *Weeds* which may be eaſily done with a *Hoe*; if the *Quick* be ſet exactly in Ranges, and about Nine Inches aſunder will be thick enough. The *Nurſery Quick* doth far ſurpaſs that which is drawn up out of *Woods* or *Hedgrows*, therefore in the Seaſon when the *Haws* are ripe, let a ſufficient quantity be gathered, and ſown in a *Bed* well prepared in ſome convenient place in your *Nurſery*, or *Garden*; after a Years growth they muſt be ſet, and if you keep them longer they ſhould be tranſplanted into *Beds*, as being ſown too thick.

For *Marſh* or *Watery Meadows Quick-ſet Hedges* are not ſo cuſtomary, yet they will grow well on the *Banks*, and are very ſerviceable and commodious to *Cattle*; the moſt uſual *Fences* are *Willows*, *Popler* and *Oſiers*, being *Aquaticks*, and are very quick growers, and by conſequence greatly profitable; for tis obſerved that a *Willow* and an *Oak* being ſet at one time, the *Willow* will buy a *Horſe*, before the *Oak* will buy a *Saddle*.

A *Popler* is alſo a quick grower, and affordeth a better *Wood* than a *Willow*. The *Oſiers* are cut every Year, and are of great uſe for divers things about a *Country-Houſe*, as for *Baſkets*, *Hurdles*, &c. Theſe, as alſo the *Popler* and the *Willow*, are cut from the *Trees* ſharpned at the points, and ſo thruſt deep into the Ground near the ſides of *Ditches*, to the end they may have the benefit of the moiſtneſs of the Water to nouriſh them. Let the *Sets* be buſht about to keep them from the injury of *Cattle* for Three or Four Years, and keep them clear from Suckers that will ſpring out in the Bodies, which hinder their heading.

The beſt way to ſet them is in *Rows*, and at about Five *Foot* aſunder; but the *Oſiers* are to be hruſt in the Bancks cloſe to the Water ſide, and at about 9 *Inches* diſtance.

Some are of Opinion, that *Enclоſures* do occaſion *Mildews* and *Blaſtings*; but that is a vulgar Error. 'Tis true, *Wheat* is ſubject to it, both in Champain and other Countreys, as well as in *Enclоſures*, in Moiſt Years, and on Rich Grounds.

Of Meadow *and* Paſture Grounds.

Meadow, and *Paſture Grounds*, are of two kinds, *viz.* Wet, and Dry: The Wet are properly called *Marſh Grounds*, being thoſe that are ſubject to Overflowings, as well Naturally, as Artificially, by the help of *Engines*. The *Dry Meadows* are ſuch as are *Uplands*, and by reaſon of their *Enclоſures* are ſubject to Improvements by propagating of new *Graſſes*, or *Hays*; as the *Clover*, *Trefoyl*, *Sainfoyn*, &c. of which in order.

Of Marſh, *or* Wet Meadow Grounds.

WET Meadows may be conſidered under three diſtinct Heads; Firſt, Such as lye near the *Banks* of *Rivers* on a Flat, and have the benefit of overflowing by *Land-floods*: Secondly, Such that lye near *Rivulets*, and may be overflown by ſtopping the Current, and turning it upon them: And Thirdly, Such Grounds that lye above the Surface of the *Water*, and are overflown by the help of *Engines* to raiſe up the Water, and caſt it upon them. All which ſorts of Ground are very improveable by *Overflowing*, eſpecially by the firſt, as leaving a more Fatning Subſtance behind, ſo that the charge and trouble of *Dunging* ſuch Grounds may be ſpared; but for thoſe that cannot be Overflown without the help of *Engines*, the Manuring is very profitable: for upon ſuch the *Water* is made uſe of chiefly in a Dry Seaſon, yet were they Overflown about a Month or five Weeks before *Mowing* time, the Advantage would be ſufficiently found by the great Burthen of *Graſs*, eſpecially if it prove a Dry Seaſon: Alſo to Overflow them after *Hay-Harveſt*, will produce a *Second Crop*, or make excellent good *After-Paſture*, recompencing the labour in a Tenfold manner. But by the way of Caution, let not the *Water* lye on the Grounds, if poſſible, above Forty eight Hours; for if it lieth too long it Chills the Ground, and doth far more hurt than good. Therefore your Grounds muſt ſo be ordered by *Rillings*, to carry off the Water into *Ditches*, and thoſe *Ditches* to convey it into *Rivers*; and for the better performing the ſame, the *Rills* and *Ditches* muſt always be kept open, ſcoured, and in good order.

There are ſeveral ſorts of *Engines* to be uſed for the Overflowing of Grounds, as the *Perſian-Wheel*, ſo called, as being there firſt uſed, and is now very common in *Italy*, *Spain*, and *France*, and draws up great quantities of Water. This *Engine* is to be placed near the *Banks* of *Rivers*.

But although this Invention, as indeed the *Wind-Mill Engine*, and ſome others, are of good uſe; yet of late Years there are others of far more worth and excellency for this purpoſe, Invented by that Ingenious Gentleman, Sir *Samuel Moreland*; and which are expoſed to Sale by his Subſtitutes, eſpecially by one now dwelling in *Southampton Buildings*, *London*, where you may make choice of ſuch as are moſt fit for your purpoſe.

Rules to be obſerved in the Overflowing *of* Grounds.

The *Water* being raiſed to the deſigned height, let the main *Carriage* be cut, allowing it a convenient Deſcent, to give the *Water* a fair Current all along: Alſo let the Mouth of the Main *Carriage* be of breadth rather than depth, ſufficient to receive the whole Stream deſired, and when you uſe but a part of the Water, let the Main *Carriage* grow Narrow by degrees, unto the end the Water may preſs into the leſſer *Carriages* that comes from the Main.

At convenient Diſtances, and where the Ground riſeth, ſmall Tapering *Carriages* ſhould be cut proportionable to the diſtance and quantity of *Water*, or *Land*; for although it ſeemeth to waſte Land by cutting ſo much *Turf*, yet it proves otherwiſe, for the more nimble the *Water* runs over the *Graſs* it is the better, which is occaſioned by making many *Carriages*, and thoſe very ſhallow.

The *Drains* muſt be ſo made as to carry off the Water the *Carriage* brings on; for as the leſſer *Carriages* convey the *Water* to every part of the Land, ſo muſt the leſſer *Drains* be made amongſt the *Carriages* in the loweſt places, to convey away the *Water*, which muſt widen as they run, and the *Carriages* be leſſened, for if the *Water* be not well drained off, it proves very prejudicial to the *Graſs*; for in the *Winter* it killeth it, and in the *Spring*, or *Summer*, it obſtructs its growth, and breeds *Ruſhes* and *Weeds*.

Of Dry Meadows, *or* Paſtures, *and the Improvements to be made thereon.*

Many good *Meadows* are ſpoiled by being peſtered with *Ant-Hills*, *Shrubs*, *Fern*, *Broom*, or *Goſs*, inſomuch that good part thereby is loſt, and cannot be *Mowed*, and that which remains is not ſo beneficial as if Mown, or Fed together. For the clearing the Ground of ſuch Annoyances, Mr. *Platt* hath invented an Ingenious *Inſtrument*, which ſomething reſembleth a three *Tined Dung-Fork*, but much larger and ſtronger, the *Stale* thereof being like a large and ſtrong *Leaver*; which *Inſtrument* ſet about half a *foot* diſtance from the Root of the *Shrub*, then with an *Hedging Beetle* drive it in a good depth, and ſo force it up by the Roots.

For

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For destroying *Ant-Hills*, being provided with a sharp *Paring-Shovel*, divide the *Turf* on the Top into four parts or quarters, laying them open several ways; then take out the *Core*, which spread on the Land, and lay the *Turf* again neatly in its place, but a little hollowing or sinking in, that is, lower than the Surface of the Earth, so that at the beginning of the *Winter* the *Water* standing therein will destroy the Remainder of the *Ants*, and by the *Spring* settle the *Turf*.

In Cold, Moist, Claiy, Spewy, Mossy, or Rushy Ground, where the *Pasture*, or *Hay* is lowr and short, about *July*, or *August*, cause the *Turf* to be pared off and burnt, as hereafter shall be directed, and Plow it up; and in the *Spring* let it be Sown with *Hay-Dust*, or with *Corn* and *Hay-Seed* mixt together, which will cause a great fertility, and alter the Nature of the Ground.

The best Season for *Dunging* of *Meadows* is in *December*, *January*, and *February*; for in these *Pluvial Months* the Fatness of the *Soyl* will be washed to the Roots of the *Grass*, before the *Sun* drieth it away; and for the breaking the *Clods* use a large Wad of *Bushes*, to draw over the Ground with a *Horse* in the nature of an *Harrow*; and what *Stones* are in the *Dung* cause to be gathered off the Ground, for they do not only hinder the growing of the *Grass*, but endanger the spoiling the *Scyth* in the Mowing it.

For such Grounds that are *Sandy*, *Hot*, and *Dry*, the best Manuring is *Marl*, *Chalk*, *Lime*, or the like Cold Soyls: and for *Cold*, *Rushy*, *Spewy*, and *Mossy Lands*, use *Ashes* of *Wood*, *Turf*, or *Sea Coal*; also *Pigeons Dung*, and all *Hot* and *Sandy Soyls*; and betwixt these two Extreams, viz. Hot and Cold, the common *Dung* made by *Horses* and *Cattle* may be bestowed upon the Grounds betwixt both.

Of the several kinds of Grass, *and* Hay.

CLOVER GRASS.

There are several sorts of *Clover*, but the best is that which is brought from *Flanders*, and bears the great Red *Hony-Suckle*, having a small *Seed* about the bigness of *Mustard Seed*, and the best is of the greenest yellow Colour.

The best way to *Sow* this Seed, is to mix it with *Ashes*, *Sand*, fine *Dust*, or the like, that will help to fill the Hand, the *Seed* being so small, and therefore not so well to be Sowed of an exact thickness in all places of it self; yet good *Seedsmen* will do it well alone, and then it is best: Also observe in Sowing it, to chuse good *Calm Weather*.

The *Season* to Sow it is in the beginning of *April*, or latter end of *March*, if it be likely to prove a *Dry Season*; and you must allow to an Acre about a *Gallon*, or Nine or Ten Pound; some say less, but you had better over than under Seed it. The *Land* must be brought to a good *Tillage*, then Sow first your *Corn*, causing the Ground to be well *Harrowed*, and then the *Clover-Seed*, Harrowing it with a *Bush* to cover it over with *Earth*; for if you should do it with *Harrows*, the *Corn* would be raised up, and so spoil the *Crop*. Be sure to be provided with good New *Seed*, otherwise your *Crop* will be but indifferent, and there is great Deceit used in it by many *Seedsmen*.

This *Grass* is said to be so profitable, that it will produce three or four *Crops* in a Year, that is, three to *Mow*, and one to *Feed*; the first *Crop* may be cut in Mid *May*, which should be Cut *green*, and before the *Stalk* begins to grow too big, as also too Dry and Wither, unless it be kept for *Seed*, and then it must be quite Ripe, otherwise the *Seed* will be hard to Thresh out. Now for your Directions to know when it is Ripe, the *Stalks* will Dye, and turn of an *yellowish Colour*; but if you intend any for *Seed*, the best is the *second Crop*, about *July*: when the *Seed* is Threshed out, the *Straw* is good for little except the *Fire*.

Some are of Opinion, that the *Clover* will grow on any Barren Ground; but by Experimental Knowledge it is found otherwise, and that the Richer and Better the Ground is, the better will be the *Clover*; therefore Sow it not upon *Heathy barren Ground*.

As to the Profit made of *Clover Grass*, an *Acre* of Ground (after the First Year, if it be well Husbanded, and good kindly thick *Clover*) may be worth Fifteen, or Twenty Pounds *per Annum*; for the two next Years, and as it degenerates and becomes weaker, is less Worth, nor will it last above five Years. An *Acre* (if Fed) will keep four *Cows* all the Year at Pasturage, which is a great Advantage. After the Strength of the *Clover* is gone, which will be after four or five *Years*, the Ground will be very fit and good for *Corn* for two or three Years, and then it may be applyed for *Clover* again. It is not to let *Cattle* that are not used to this *Food*, to eat too liberal of it at first, for it being so sweet and luscious will Surfeit them; so that the best way is to Cut it, and give it them in *Racks*, as they do in *Flanders*. It is also good *Food* for *Hogs*, and will make them Fat.

An Acre of *Clover* may produce three or four *Bushels* of *Seed*, and about three *Pecks* is a good Days Work to Thresh.

SAIN-FOIN.

The *Soyls* proper for this *Grass* are Barren, Dry, Stony Ground, hardly fit for *Corn*, or *Grass*; but all *Clays*, and other Cold, Wet Grounds, bear it not. There is such great Improvement made by this *Seed*, that Grounds not worth 2 *s.* an Acre, may be made worth 30 or 40 *s.*

The *Seasons* for Sowing it are in *Autumn*, from the beginning of *August* until the end of *September*; and in *Spring*, from the beginning of *February* until the end of *March*: And the Earlier it is *Sown* in either *Season*, the better it is.

'Tis

'Tis a large and light *Seed*, and there must be Sowed four *Bushels* to an *Acre*.

In *Autumn* the *Tillage* must be as if for *Wheat* fine *Plowed*, and also as well *Harrowed*; and then *Sow* it, and *Harrow* it again to cover the *Seed*. In *Autumn* it must be always *Sowed* alone without *Grain*; but in *Spring* with *Oats*, or *Barley*, Sowing the *Corn* but thin. In *Spring* the *Husbandry* must be the same in all respects as for *Summer Corn*, and *Sown* as before directed.

Never *Broken Ground* can't be *Sown* with it; but if the *Ground* be presently turned up after the *Crop* is off, and well *Harrowed*, it may be fit to *Sow* the *Spring* following.

The Ground sowen with this Seed, must be well fenced in, and secured from *Cattle* the first Year; the second Year it may be *Mowen*, and fed about *Allallontide*, but when the Weather is wet, the *Cattle* should be taken out for fear of Spoiling the *Roots* until they be strong, which will be the third Year; and if it be not of a sufficient growth to Mow the second Year, (as sometimes it will not,) then feed it, observing the former caution not to let the *Cattle* too much trample it, until the third Year. But always after (as long as it lasts which may be thirty Years) it may be either *Mown* or *Fed* at pleasure, without any Emendation of *Dung*. But it is best to be sometimes *Mown*, and sometimes *Fed*; when it is designed to be *Mown*, it must be laid in about *Our Lady Day*; and it will be fit to *Mow* in the middle of *May*, when it begins to Flower: It is made in all respects as other *Hay*, and is very good for all *Cattle* (except *Sheep*) as being too gross for them, breeding store of Milk; and in the Winter Season 'tis good for *Sheep*.

TREFOIL, or NONSUCH.

This *Grass* is of that Nature to grow upon the poorest Land that is; and although quite worn out by frequent *Tillage*, yet will produce good and profitable *Crops* of Grass, and all Land naturally kind for *Corn*, and unkind for Grass, is kind for *Trefoil*.

The *Pasture* is very good for *Cattle*, especially for *Cows*, causing great Increase of *Milk*; and the *Hay* is as Nourishing and Fatning, provided it be *Mowed* and made in good Season, whilst it is full of Yellow Blossoms, and not over-dryed, being soon made; and then it will not lose its colour, nor shrink in making as the *Clover-grass* doth, being much finer and greener. It is also exceeding good for *Ews* and *Lambs*, it being a sound feeding, and free from Rottenness; nor is it subject to Surfeit the *Cattle* as the *Clover*; and therefore it is very good for preventing this mischief, to mix in the Sowing one Moity of this Seed with another of *Clover*, which doth thrive very well together, and affords both good *Hay*, as well as *Pasturage*.

The *Trefoil* will endure much longer if it stand not for Seed, for that is Destructive to the *Root*, and the Sap is gone that should nourish it; because it must be cut late, and in the Heat of Summer, always provided the Ground be Sown with clean *Seed*, separated from the Husk wherein it grows, otherwise your Expectation will fail in every point; for if it be not, it is impossible to cleanse it from the course and sour Grass which mixes with it; and is so destructive to the *Trefoil*, that it will not last half so long; for as the course Grass encreaseth every Year, so the other decreaseth. The next Year after the *Corn*, it may be either *Fed* or *Mown*.

The best Season for *Sowing* this *Seed*, either with *Oats* or *Barly*, is from Mid-*March* to the end of *April*; and it must be Sown after the *Corn*, as before directed for the other *Seeds*; and afterwards finely Harrowed, and Rowled. About a dozen pound of Seed is sufficient for an *Acre*.

Whereas *Land* that is brought out of Heart by frequent *Tillage*, produceth *Couch-Grass*, *Twitch* and the like *Weeds*, that are great Enemies to the *Corn*, and impoverisheth the Land; this *Trefoil* doth enrich the Ground, and prepares it for *Corn*, destroying the *Couch-Grass*, and the like Weeds if it be kept *Mowed*, and Plowed again before the *Trefoil* be decayed, and other Grass grow up in the Room; and will likewise bear far better *Corn* than before: And when it is again worn out, will bear good *Trefoil* as before.

La LUCERNE.

For Sowing this *Seed*, observe the same Method in ordering the Ground as for the other Seeds. It must be sown about the Middle of *April*, and some *Oats* may be sown with it, but not so great a proportion as with other *Seeds*. The Land must be well dressed, and at least three times fallowed. It may be *Mown* twice every Year, and *Fed* all the Winter; The *Hay* if well made and ordered, is very good for all kind of *Cattle*, especially for *Horses*; and is good to fat store *Cattle*. It must be given with Caution at the first, as directed for the *Clover*, for fear of Surfeiting, so that it is best to be mixed with *Straw*, or *Hay*. An *Acre* will serve three *Horses* all the Year at Pasturage; and will soon raise them to Flesh, and make them Fat.

If it be *Mown* but once a Year, it will hold ten or twelve Years, but if twice a Year not so long.

There are several sorts of other *Grasses*, but these being the chief I shall omit the rest, only to say that *Hop Clover*, *Trefoil*, or Three *Leaved Grass* are both finer and sweeter than the great *Clover-Grass*, and will grow in any Ground. They may be Sown with *Corn* as before directed, or without, or being Sprinkled in *Meadows* will much mend the *Hay*, both in Burthen and Goodness.

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CHAP. III.

Of Arable Land, how to order it with the several Grains usually Sown.

THe great and chiefeſt knowledge of the *Husbandman*, conſiſts in the Underſtanding the true Nature of the Ground, for every ſort of *Land* almoſt requires a different ſort of *Huſbandry*; ſome Grounds yielding plenty of that which on another will not grow. The ſtiff and ſtrong Ground receiveth the greateſt Improvement from the *Plough*, and the light, warm and Mellow Land is moſt fit for *Plantations* and *Gardenings*; not but that the Light and Mellow Ground is good for *Corn*, but the ſtiff is not ſo good for *Plantations*. Alſo *Moſſie*, and ſuch like Grounds are much improved by *Ploughing*.

All ſtiff, Clayey, moiſt and cold Grounds are generally thrice *Ploughed* for *Wheat*, and four times for *Barley*; for the ſeveral *Ploughings* are very Advantageous to the Ground in divers reſpects, as killing the *Coutch*, *Twitch* and the like *Weeds* that the Ground is ſubject unto; It alſo makes it light, Mellow and Finer for the *Seed*; and by giving it a Fallowing in the *Summer*, is as good as a forry Dunging to it.

Land that hath layn long for *Paſture*, will be ſubject to *Moſs* and *Weeds*, ſo that *Ploughing* of ſuch *Land* for two or three *Crops*, will be very Advantageous, not only in the *Crops*, but alſo to the Ground, eſpecially if when it is laid down it is Soiled, or Sown with ſome of the aforeſaid *French Graſſes*.

There is much waſt Ground in divers parts of this Kingdom, as *Heaths*, *Moors*, and *Commons* ſubject to *Broom*, *Ruſhes*, *Fern*, *Heath* and the like, which if enclоſed and good *Husbandry* uſed on them, would become good Grounds, Experience of which hath been made in many parts of *England*, on Ground that would ſcarce bear *Graſs*, to produce good *Crops* of *Corn*; and the way to effect this is to *Burn*, or *Denſhire* them as hereafter ſhall be Treated of; which is ſo exceeding Advantageous, that two or three Years *Crops* have been worth the Inheritance of the Land; and after two or three *Crops* of *Corn* being lain down for Paſture, and Sown with ſome of the aforeſaid *French Graſſes*, do become good Paſture Grounds, eſpecially to what they were before.

The ſeverally ſorts of Grain uſual Sown in England.

THe *Husbandmans* great care is to underſtand the Nature and Temper of his Land, and what *Grain* is beſt agreeable thereunto, otherwiſe he can expect but indifferent *Crops*.

There is no *Grain* ſo uſeful, and Univerſal as *Wheat*, of which there are ſeveral ſorts, as the *Poland Wheat* both White and Red, Great and Small, the *Straw Wheat*, *Rivet Wheat*, both White and Red; The *Turkey Wheat*, the *Gray Wheat*; the *Flaxen Wheat*, which in ſome places is ſuppoſed to be called *Lammas Wheat*, *Chiltern-Ograve Wheat*, *Saraſins Wheat*, with other Names which tis probably may be the ſame ſorts: Of theſe ſorts ſome prove good for cold and ſtiff Land; and others for that which is Hot and Dry. The *Great Poland* and the *Ograve* delights in ſtiff Ground, the *Flaxen* and *Lammas* on indifferent Lands; and the *Saraſins* on any. The *Bearded Wheat* is not Subject to *Mildews*. The beſt Seaſon to Sow *Wheat* is about *Michaelmas*; and rather when the Weather is wet than dry.

RIE is a *Grain* uſed next to *Wheat* for *Bread*, and both mixt together in the Sowing (which is called *Meaſeline*) makes an excellent ſort of fine moiſt and Palatable *Bread*. This *Grain* may be Sown ſomething later than *Wheat*, if of it ſelf, and will Grow on a lighter and poorer *Land*; It requireth a dry Seed time, it is a great bearer, and yields an advantageous *Crop*.

BARLEY is a profitable *Grain*, but the Ground muſt be good and brought to a fine *Tilt*; the beſt Seaſon is about the latter end of *March*, or beginning of *April*; and to be Sown when the Weather is dry, is very convenient.

OATS is a *Grain* much uſed in the Northern Parts of this Kingdom for their *Bread*, as alſo for their *Malt*, making good *Beer*. This Grain groweth almoſt on any Ground, nor is there that fineneſs of *Tillage* required as for *Barley*, for this may be Sown upon a *Laye*. The Seaſon is in *February* and *March*. There are two ſorts, the *White* or *Poliſh Oat*, which is a fine weighty Grain, and the *Black Oat* much Sown in Fenny Grounds, which ſort of *Corn* is light, lank, long tayled, and not ſo good as the *White*.

PEASE are of great uſe and very profitable; there are ſeveral ſorts, as the *Green*, the *Gray*, or *Hog-peaſe*, the large *Rouncifals*, and the *White* which are of ſeveral ſorts, as the *Hotſpur*, *Reading*, *Haiſting*, and *Sandwich*: And for the Sowing them, ſeveral Seaſons are to be obſerved, that is, ſooner or later as you would have your *Crop* to be Ripe; for the *Hotſpur* about *Chriſtmas* is a good time, but if the Seaſon prove froſty ſomwhat later. *Peaſe* do much *Mellow* Land, making it fit for a *Crop* of Winter *Corn*; and it muſt be Sown in a good Ground, your Stony, Ruſhy Land being unfit for it.

BEANS delight in a ſtrong deep Land, and are of chief uſe for fatting *Hogs*, and being ground and mixt with *Oats*, are a good ſtrengthening Food for *Horſes*.

TARES, or *Fetches* are not of ſuch great uſe, but *Pigeons* much delight in them. It is good *Fodder* for *Horſes* if cut green. It requires indifferent good deep Ground, the Seaſon is about *February* or *March* to Sow them.

LENTILLS, or *TILLS* are very good *Fodder*, they grow on any Ground, yet afford a great Encreaſe.

LUPINS are a *pulſe* of a very great profit, growing on any Sandy, Gravelly or Ruſhy Ground, being fodden in Water are good Food for *Swine* and *Oxen*.

BUCK-

To the Worſhipfull of Farnley in of Yorkſhire

Thomas Fawkes the Weſt riding Eſquire

This Plate is humbly Dedicated by. Richard Blome.

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good *Crop*, and curiously dryed it like unto *Hops*, to a perfect and just gage of Drought.

Of RAPE, or COLE-SEED.

THis *Seed* is very profitable to be Sowed upon *Marsh*, or *Fenny-Land*, or indeed upon any Moist Ground, that is of a fat and rich Soyl. The best *Seed* is the biggest, and it must be dry and of a clear Colour, like the best *Onion-Seed*.

The *Season* for Sowing it is about *Midsummer*, and the *Land* must be well *Plowed*, laid Fine, and Even; about a *Gallon* will Sow an *Acre*, and for the Sowing it Even, it should be mixt with fine *Dust*, or *Ashes*, as before directed for the *Clover*.

The principal use of this *Seed* is for making *Oyl*, and a good *Crop* is about five *Quarters*, and commonly worth 4 *s.* a *Bushel*. When it looks Brown it is time to Reap it, which must be done as *Wheat*, only it is not to be bound up, but must lye in handfuls upon the Ground until it be dry, which will be about a Fortnight, and when it is dry it must be gathered up on *Sheets*, or large *Sail-Cloths*, and so carried into the Barn to *Thresh*, for fear of shedding, to which it is much subject.

Directions for the Preparation of the Seed.

BY Nature every *Seed* is found to differ from another, and to require a different Nourishment, insomuch that one sort of *Seed* will thrive where another sort will not; and by Experience it is found very advantagious for the *Husbandman* to change his *Seed*, especially for Land that is tyred out with frequent Tillage, into Land newly broken up; and from dry, barren and hungry Ground, to that which is fat and rich. The like is observed by *Cattle* that are taken out of barren, short, or sour Pasture, and put into that which is good and sweet, how they thrive over those that are not exchanged. The like is observed by *Trees* that are removed out of Barren bad Ground, into a good rich Mould.

Seeing then the *Husbandmans* great care is to Manure and Enrich his Ground. I shall with what brevity I can give an Account of the several ways, and *Soyls*, or *Composts*, for effecting the same.

CHAP. IV.

Of Manuring, Dunging, and Soyling of Lands.

Soyls and Manures taken from the Earth.

LIMING of *LAND* is very good, much improving Barren Ground; about fifteen or twenty Quarters of *Lime* is sufficient for an *Acre*. Also a mixture of *Lime* and *Dung* is a very good *Compost* for Land. But where there is not the conveniency of a *Kiln*, to burn the *Chalk* into *Lime*, simple *Chalk* may be used, which by *Frosts* and *Rains* will be dissolved, and prove a good enrichment to the Ground, and will also be very good to mix with *Dung*: That which is called *Chalk-Rubbish*, being the Offals of the *Lime*, is the best for this purpose.

MARL is very good for the enriching of *Land*, insomuch that it is commended by all Authors; there are several kinds of it, as some *Stony*, and some *Soft*, and some of divers Colours, as *White*, *Yellow*, *Gray*, *Black*, *Blew*, *Russet*, and *Red*.

It is of a Cold Nature, and very much saddens Land; the Goodness and Badness thereof is not so much known by the Colour, as by the purity and uncompoundedness of it, being smooth like *Lead-Oar*, without any composition of *Sand*, or *Gravel*.

It is an excellent Improvement to High, Dry, Sandy, Gravelly, or Mixt Lands, though never so Barren, keeping them in good heart fifteen or twenty Years, and on some Grounds a longer time; but its strength and vertue will not appear the first Year, so much as in the succeeding Years, until it begins to wax out of heart.

Strong *Clay Ground* is not proper for *Marl*.

In the Spring lay the *Marl* on Light, Dry, Sandy, and Gravelly Grounds, as aforesaid; and in the beginning of Winter on Hard and Binding Grounds, and spread it abroad, that the *Frost* may moulder it in pieces. Yet some are of Opinion, that the Winter Season is the best to lay it on, for any sort of Ground.

FULLERS-EARTH is likewise a good Soyl, and is to be used after the manner of *Marl*.

CLAY is a very good Improvement to Dry, Light, and Sandy Ground, being spread thereon like *Marl*, or other *Soyls*.

By the same Rule that *Clay* is good for Light and Sandy Ground, *SAND* is good for Strong, Cold, and Stiff Land, a sufficient quantity thereof being laid thereon; but as to the quantity, it is good to try the Nature of the Ground, and accordingly add a greater or lesser proportion. The best and fertilest *Sand* is that which is washed from the *Hills*, or other *Sandy* places, by the violence of *Rain*.

Sand is also very good to mix with other *Compost*, and for raising a good quantity thereof, in the Winter House your *Sheep*, and other *Cattle*, but not altogether, for fear of spoyling one another; and there *fodder* them, having *Racks* placed up and down in the said *Houses*. Let there be first spread on the Floor a good thick *Coat* of *Sand*, and short Mushy *Straw*, good for little else, upon which they will *Pisse* and *Dung*; and when it is well covered therewith, then lay on another *Coat* of *Sand* and *Straw*; and this course using will make a considerable quantity of very good *Soyl*, for the enriching of any sort of Ground.

The

The *DIRT*, or *Soyl* of *TOWNS*, is a very good Improvement.

Soyls taken from the Sea-Shoar.

THe *SANDS* of the *Sea-Coast*, and *Creeks*, being of a Saltish nature, is very good for the Improving of Barren Land, and is much used in the Western parts of *England*. The like they do by Soyling their Land with the *Sea-Weeds*, *Sea-Ooze*, or *Oozy-Mud*, which turns to a very great Advantage.

In some places, when the glut of the Season of *Fishing* is, and that they are very cheap and plentiful, cast a good quantity upon the Land, which will cause an exceeding great Fertility, though never so Barren before. And without doubt there is nothing that proceeds from the *Sea*, or *Rivers*, whether *Fish*, *Garbish* of *Fish*, *Shells*, *Sand*, or *Mud*, but is very profitable to the enrichment of the Ground, if Judiciously applyed.

Of Dungs, and other sorts of Soyls, and Manures.

SHEEPS-DUNG is the best and richest, so that the *Folding* them on the Land (which is but a thin sprinkling) causeth as great a Fertility as an indifferent *Dunging*.

HORSE-DUNG, which is the most common, by reason of their keeping in *Stables*, and their Soyl preserved and cast up in *Dung-hills* to Rot with the *Litter*, is also a very good Manuring to *Land*, being of a hot Nature, and therefore excellent for *Gardens*, as also for *Cold Grounds*.

COW-DUNG is of a colder quality than that of *Horse* or *Sheep*, and therefore more fit for hot and sandy Grounds.

SWINES-DUNG is very good, and esteemed better than *Cow-Dung*; and great quantities may be made from about a Score of *Hogs*, if well ordered; which is to keep them up in a *Yard* of an indifferent largeness, well Paved, with a little Falling one way, to the end their *Piss* may fall to one part where the *Dung* should be Shovelled up to Rot. Let their *Sheads*, or *Styes*, be made along the side of the *Pales*, at the Upper part. The *Hog-Troughs* should be fixed in the Ground, with some part without the *Yard*, for the better conveniency of giving them *Meat* therein without coming into the *Yard*; and for the making the greater quantity of *Dung*, cast into the *Yard* (besides their other *food*, as *Roots*, *Offal*, *Wind-falls* of *Fruit* in the time of the Year, *Coleworts*, and *Cabbage-Leaves*,) great store of *Fern*, or *Mushy Straw*, to make *Dung* of, which they will soon do by their Trampling, Lying, and Dunging upon it, insomuch that there may be made yearly of good Soyl out of such a *Hog-Yard*, about forty or fifty Loads.

The *Dung* of *FOWLS*, as *Pigeons*, *Hens*, *Ducks*, *Geese*, and *Turkeys*, is excellent, one Load being worth a Dozen of ordinary *Dung*, so that instead of laying it on the Land in the ordinary Husband-like way, it should be sown on the Ground.

WOOD-ASHES makes a good *Dung*, and enricheth Land; so doth those of *Sea-Coal*, *Peat*, *Turf*, *Fern*, *Stubble*, *Straw*, and *Moss*, in cold *Marsh*, or *Meadow Grounds*: And if *Sea-Coal Ashes* are mixt with *Horse-Dung*, they make an excellent *Compost* for divers uses.

SOAP-ASHES are esteemed a very good Soyl both for *Arable* and *Pasture Ground*; that is, the Stuff that comes from the *Soap-Lees*, when the *Soap-Boylers* have done with it. The best Season to lay it on the Ground is in the beginning of Winter, that the Rain may wash it into the Earth.

RAGS are excellent Soyl for Land, one Load going as far as a Dozen of ordinary *Dung*.

MALT-DUST is a very great enricher of Barren Ground. The way to use it is thus; After your *Corn* is Sown and Harrowed in, take the *Malt-Dust* and Sow it over the Ground, as you do *Corn*; about four Quarters is sufficient for an *Acre*, and as near as you can let the *Dust* be Sown in a Wet Season, that the *Rain* may wash it into the Earth. This is as good an enrichment to Ground (especially for one *Crop*) as an ordinary *Dunging*. This *Malt-Dust* is to be bought of *Maltsters*, or great *Brewers*, and for about 3 *s.* the *Quarter*.

HAIR, *HORN-SHAVINGS*, *Shreds* and *Pieces* of *LEATHER*, are found to enrich Ground very much, being thinly strewed thereon.

SOOT is very good, especially that which is made of *Wood*; It is most beneficial to *Trees*, or *Plants*, that either grow in the Shade, or in Cold and Moist Grounds.

SALT, if used with moderation, is said to be a good Improver of Barren Ground, and doubtless it is true; for by Experience it is found, that *Corn* being steeped for some time in *Brine*, doth not only cause Fertility, but also prevents *Soot* in the *Ears*, and some say *Blighting* also; but that I shall not aver.

The ways and means of Improvement of Grounds by *Dunging* and *Soyling*, as aforesaid, is very good and effectual; but in many places very chargeable and troublesom, by reason that it can't be obtained but at dear Rates by *Carriage*, or otherwise; so that the profit accruing thereby will not answer the Expence and Trouble. In this case your *Art* must be used to the Seed designed to be Sown on such Land, and for that, there are several ways to be used, some of which are as followeth.

Let your *Corn* be steept in *Dung-water* for some time, wherein put some *Salt-Peter*; then lay it to dry on some Floor, and so Sow it. It is also good to steep the *Corn* in new *Ale*, or *Wort*; but more effectual to steep it in *Nitre*, or *Sal-Terræ*, which is so highly extolled by *Glauber*, being that fixed *Salt* extracted out of any *Ashes* either of *Vegetables*, *Animals*, or *Minerals*, that are throughly calcined.

SHEEPS, or *PIGEONS-DUNG*, dissolved in *Water*, with *Salt* cast therein, is very good to steep *Corn* in: But above all take ten, or twenty Gallons of *Train-Oyl*, or such a quantity as you shall have occasion for; put it into a

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large *Veſſel*, and caſt therein your *Corn*, that is, ſuch a quantity as the *Oyl* will well cover, and there let it lye and ſteep until it be ſupple, and as it were glutted therewith; then take it out, drain it, and ſpread it on a *Floor*, and with a *Sieve* ſprinkle it over with *ſlack't Lime*; then with your *Corn-ſhovel* let it be turned, that the *Lime* may encruſt the *Corns*, or *Grains*, all over, and ſo Sow it. This way is recommended for an excellent Improvement, exceeding all the others; for the *Oyl* is farning, and the *Lime* doth preſerve it from *Vermin*, as alſo from *Smut*.

There is another compound *Liquor*, which is ſaid to ſurpaſs the former; that is, Take a quantity of *unſlack't Lime*, put thereto as much *Water* as will make it ſwim about four *Inches* above the *Water*, and unto the *Water* that is poured off mix one tenth part of *Aquavitæ*, and in that Liquor ſteep your *Corn* about twenty four Hours; then take it forth and dry it; which done, put it in the ſaid Water again, and let it ſteep twenty four Hours more; then take it forth and dry it; and obſerve the like way a third time; then Sow it, but ſo thin, that every *Corn*, or *Grain*, may be about nine *Inches* apart, if poſſible; and 'tis ſaid, that one *Grain* will produce thirty or forty *Ears*, very large, with a large and tall *Stalk*; but this I leave to Trial, not averring it for Truth.

Of BURNING *of* LAND.

THe *Burning* of *Land*, or indeed any other operation on it by *Fire*, is a very great Improvement to Barren and Poor Ground, be it wet, or dry; and this is the only Improvement the *Americans* uſe; for the Burning of any combuſtible thing on the *Land* doth much heat the Ground, and waſtes that Acid ſterile Juyce that hinders its Fertility.

This Art of *Burning* of *Land*, commonly calſen *Denſhiring*, is not to be practiced on Ground of a good, rich, and looſe Soyl, that produceth flouriſhing *Crops*; but only upon Barren, Sour, Hide-bound, and Ruſhy Ground, be it either dry, or wet; hot, or cold.

The uſual way to effect the *Burning* of *Land* is as followeth, you muſt be provided with a *Breaſt-Plough* to pare off the *Turf*, which muſt be turned over as it is cut, that it may dry the better; and if it prove a Wet Seaſon, the *Turf* muſt be turned again, and ſet up hollow, the better to dry; and being throughly dryed, they muſt be gathered up and put in ſmall Heaps, of about two *Wheel-barrows* full in an Heap. If the *Turf* be full of *fibrous Roots*, or hath a good Sword of *Graſs* upon it, it will burn without any other *Addition* of *Fewel*; if not, the Heaps muſt be raiſed on a ſmall Bundle of *Goſs*, *Fern*, or *Straw* to ſet it on fire; and being conſumed to *Aſhes* in a ſtill time (when the *Wind* will not hinder the equal ſcattering) let them be ſtrewed on the *Land*. Then on thoſe places where the *Hillocks* were, the *Earth* muſt be pared away, to abate its over Fertility, cauſed by the *Fire* made thereon.

And Note, That the Land muſt be but ſhallow, or half Plowed, and not above half Seeded, and alſo Sowed late in the Seaſon, to prevent the over-rankneſs of the *Corn*; but for the *ſecond Crop* obſerve the uſual Husbandry as to your other Grounds.

CHAP. V.

Of Herbs, Roots, Fruits, Plants, &c. Planted and Propagated in the Kitchin-Garden; *with Inſtructions how to Sow, Raiſe, and Order them according to the ſeveral Seaſons, as well thoſe for Food, as others for Advantage.*

Of HOPS.

HOPS are now grown a *National Commodity*, although formerly Petitioned in *Parliament* by the *Londoners*, to be Prohibited the Importation or Growth in this Kingdom, as a Nuſance, or an Offenſive *Commodity*, for that it would ſpoil their Drink, and endanger the Peoples Healths, it being an unhealthful *Herb*, occaſioning the *Stone*; for before *Hops* were uſed in Drink, that Diſeaſe was not known in this Kingdom: However it advanceth *Land* to ſuch an Improvement, that ſometimes an *Acre* is worth Fifty, or Sixty Pounds; but it is an uncertain Crop, for overmuch Drought, or Wet, ſpoils it; the like doth *Mill-dews*, which makes the Price ſo uncertain.

The *Hop* delights in the richeſt Land, or deepeſt Mould, and Light (if mixed with *Sand*) is the better; alſo black Garden Mould is very good; but a Barren Mooriſh Soyl is altogether unfit for it.

If it lyes near the *Water*, and yet Dry, it is the better. It alſo ought to lye warm, and free from the *North* and *Eaſt Winds*, as being ſheltred by *Hills*, or *Trees*.

If the *Land* that you deſign for a *Hop-Garden* be cold, ſtiff, four, or barren, it will be convenient to burn it about the latter end of Summer, and to make the Ground mellow, light and free from *Weeds* by ſowing it with *Turnips*, *Hemp*, or *Beans*; And fail not to Till it in the begining of Winter with the *Plough* or *Spade*, be it in what condition ſoever.

For the planting the Ground, the beſt way is to make the *Hill* where the *Plants* are to be ſet in Squares, by which means the Ground will be better to plough, and at every place where there is to be a *Hill* thruſt down a ſmall Stick for your directions, the better to make the *Hill*; and if the Ground be poor and ſtiff, make the Holes good by putting therein good *Mould* or rotten *Dung*, which will ſufficiently repay the charge and trouble.

As

As to the diſtances of the *Hills*, if the Ground be deep, moiſt, and of a rich *Mould*, about Eight *Foot* aſunder is convenient; but if of a dry and burning quality, then not above Six: And let the Ground be what it will, ſo order it that there may be room to come between, and that they may receive the influence of the *Sun*; for in moiſt Years the *Hops* grow large, ſo that the wider the *Hill* the better; and in hot and dry Years they grow thin, ſo that the nearer they are the more *Hops* they bear. Let the *Hills* be made of a middle ſize, for if they are big, they require the greater quantity of *Poles*, and cannot be ſo conveniently dreſt.

The Seaſon for planting your *Hops* is about the end of *March* or begining of *April*, but experienced *Planters* affirm that the beſt time is in *October*, for then the *Hops* will ſettle againſt the Spring.

Let the *Sets* be the largeſt you can get, with Three or Four *Buds*; and before you take the Sets out of the Ground, let the Holes be ready to receive them, and made as deep as the Plant or Set, and about a *Foot* over, and at every corner of the Hole put a Set, and raiſe the Earth Two or Three *Inches* above it; but if you Plant ſo late that the Green Sprigs are ſhot forth, then cover them not quite for fear of killing them.

If your *Hops* are Old or Worn out of Heart, through ill *Huſbandry*, then about the begining of *Winter* dig them, and take away as much of the Old *Barren* Ground, as you conveniently can, and in the Room thereof (after they are dreſſed) put good rich *Mould*, or Rotten *Dung*, which will exceedingly Nouriſh and revive the *Roots*; and the *Winter* digging or tilling will deſtroy the *Weeds* and *Couch Graſs*: But if the *Hops* be ſtrong and in good Heart, then dreſs them not until *March*, or the begining of *April*, and in dreſſing the *Hops*, theſe Rules are to be obſerved, *viz.* Pull down your *Hills*, and undermine them round about to come to the principal *Roots*, and ſhake off the Earth from the Younger *Roots*, and cut them away, preſerving well the old Sets, and in the Firſt Years cutting uncover no more than the Tops of the Old *Sets*, and cut not the *Roots* before *March*, although you pull down the *Hills* ſooner. The *Roots*, that grow downwards are not to be cut, but only ſuch that grow outwards at the ſides of the *Sets*. The Old *Roots* are red, thoſe of the laſt Years white.

For the *Poling Hops*, if the *Hills* are wide, the more *Poles* are required, and if the Ground is hot, dry, and hungry, the *Poles*, may ſtand nearer together than in Rich and Mellow Ground; where they muſt be alſo larger, and longer, otherwiſe the beſt profit will be loſt; whereas on the contrary if the *Land* is Poor the *Poles* muſt be ſmall, for if over-poled the *Hop* will run it ſelf out of Heart, eſpecially the Firſt Year: And begin not to *Pole* until your *Hops* appear above Ground, for then you may diſcern where the bigeſt *Poles* are required; and you may continue *Poling* until the *Plants* are about a Yard in height. *Poles* of *Alder* are eſteemed the beſt, as being Streight and tapering, and of a rough Rind, ſo that the *Hop* will not ſo eaſily ſlip down; But for laſting the *Aſh* is to be preferred before the *Alder*. Be ſure to fix the *Poles* deep in the Earth that the Wind force them not out, and let them lean outwards from one another, to prevent *Houſling* as they call it, for thereby they will have the greater benefit of the *Sun*, and by conſequence bear more and better *Hops*; and you ſhould be always provided with ſpare *Poles* if in caſe any ſhould break, for if the *Hops* lie on the Earth they will ſoon Periſh.

Your *Hops* being got Two or Three *Foot* above Ground, it is time to fix them to the *Poles*, by winding them about according to the Courſe of the *Sun*, and by faſtning them thereto; but in doing this be ſure not to break the young and tender *Shoots*.

In *April* and *May* your care is required to be guiding the *Shoots* to the *Poles* as you would have them, which may be done with forked Sticks where they are out of your reach.

About *Midſummer* the *Hops* begin to leave ſhooting or runing at length, and then begin to Branch; at which time thoſe that are not at the Tops of *Poles*, ſhould be nipt off at the Top, to cauſe them to Branch the better.

In *May* after *Rain*, you ſhould pare off the Surface of the Earth, with a *Spade*, *Hoe*, or *Breaſt Plough*, and with the parings raiſe up the *Hills*, burying all Superfluous *Shoots* of the *Hops*, as alſo the *Weeds*.

If it prove a dry *Summer*, it is requiſite to Water the *Hops*, making a Hole in each *Hill*, the better to receive the Water, and then raiſe up the *Hills* to keep the *Roots* cool; once or twice watering is ſufficient in the dryeſt *Summer*.

About the End of *July* *Hops blow*, about the begining of *Auguſt* they Bell, and are ripe in the latter End of *Auguſt*, or begining of *September*. The *Signs* of their being ripe are the changing their Colour to brouniſh, and their fragrant ſmell.

The beſt way for gathering *Hops* is in a *Frame*, or *Bin*, made for that purpoſe of *Canvaſs*, and ſhort *Poles* to remove from place to place, and the *Pickers* to ſtand on each ſide to gather the *Hops*, and ſo convey them to drying; but cut no more *Stakes*, nor draw no more than can be diſpatched in an hour or two, for fear of *Rain*; and let them not be over Ripe before you gather them, for fear of ſhedding the *Seed*, which is the ſtrength of the *Hop*: and gather them as free from *Leaves* and *Stalks* as poſſible.

About Four Pound of *Hops* throughly ripe will make One Pound when dryed; but if gathered before they are ſo Ripe, then there will be about Five Pound to make one. Great care is required in the well drying the *Hops*, for a little quantity ſlack dryed will ſpoil divers Pounds.

There are ſeveral ways, as in *Kilns* made for that purpoſe, firſt invented in *Holland*; but that which ſeemeth eaſier, and better, is to dry them on an ordinary *Malt-Kiln* on a *Hair-cloth*, laying them about Five or Six *Inches* thick, and when they are almoſt dry, to turn them up ſide down with a *Scoop* made for that purpoſe, and ſo let them lye until they are throughly dryed, and

then

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then remove them in the *Hair-Cloth* to the Heap where they are to lye till picked. In ſtead of the *Hair-Cloth* ſome uſe a *Tin-Floor*, or *Bed*, to lay over the *Kiln*, to put the *Hops* in, which is preferred far before any of the former ways, as being more ſure, leſs expenſive, and more expeditious.

Before you *Bag* up the *Hops*, after they come from the *Kiln*, let them ly Three or Four Weeks to cool and toughen, otherwiſe they will be brittle, and break to Powder. The better the *Bags* are trod the better will the *Hops* keep.

Clear your *Hop-Poles* from the *Hawm*, and lay them up in ſome *Barn*, or dry *Shed*, for uſe the next Year, for *Poles* are chargable, eſpecially in many parts of *England*.

Of SAFFRON.

THis is the richeſt *Commodity* that this Kingdom produceth, quantity for quantity; and is very ſovereign for divers *Diſeaſes*, and much uſed for ſeveral occaſions. The beſt Seaſon to plant, or Set it, is about *Midſummer*, and the Land muſt be brought into a very good and fine tilt, and of a rich *Soyl*; for the better the Land is the better Crop it will produce. For the *Planting* the *Sets* you muſt make uſe of a very broad *Hoe*, and with that draw the *Land* into Ranges open like *Furrows* (as if for *Peaſe*) and about Two or Three *Inches* deep, in which the *Sets* are to be planted about Three *Inches* aſunder. Let the Ranges be well covered over with Earth and about Four *Inches* aſunder, very ſtreight, to the End the Ground may be the better *Hoed* to clear the *Weeds*. The Winter following it grows green like *Chives*, or ſmall *Leeks*, and in the begining of the *Sumer* it quite dieth as to appearance, but it muſt be clean *Hoed*, and then will come up the *Flower* without the *Leaf* which in *September* appears like the *Blue Crocus*, in the midſt of which comes up Two, or Three *Chives* of a deep yel low, which is the *Saffron*, which is to be gathered from the *Flower*, and very early in the Morning otherwiſe it will return back into the Earth until the next Morning. The Seaſon laſts about a Month for the gathering it, ſo that you muſt have many Hands to pick it.

The beſt way to dry it is to make uſe of a *Kiln* made of *Clay* and *Sticks* in the faſhion of a *Bee-Hive*, but not ſo big, and a little Fire made of *Char-Coal*, being carefully tended, will ſerve to dry it, for it muſt not be too dry.

An *Acre* may produce Fourteen, or Fifteen, Pound of good *Saffron*; but Eight or Ten Pound is reckoned an indifferent good *Crop*.

When the *Crop* is off, about *Midſummer* is the time to take up the *Sets*, or *Plants*, and to ſet them again as before directed, which courſe muſt be obſerved every Year, for a *Crop* will hold good but one Year.

The Country about *Saffron-Walden* in *Eſſex* is noted for this *Commodity*.

Of LIQUORICE.

THe beſt Land for *Liquorice* is the richeſt, warmeſt, dryeſt, and of a very deep Soyl: Before the *Sets* are Planted, the Ground muſt be dug, or rather Trenched about three *Spades* depth, and laid as light and hollow as poſſible: And if the Ground be not Naturally very rich, it muſt be made ſo by Manuring, for which *Horſe-Dung* is eſteemed the beſt, as being hotteſt.

Your *Land* being well prepared, and laid out into four *Foot Beds*, you muſt get the beſt and largeſt Sets you can, which are thoſe called *Crown-Sets*, or *Heads* taken from the top of the Root, or a little ſhived down; and Plant the *Sets* in *Beds* at about a *Foot* diſtance from each other, with a *Dibber*, or ſuch like Tool, to make Holes in the Ground, and let the Earth be well cloſed. If it prove a very dry Seaſon when they are Planted, which is in the Months of *February*, and *March*, then let them be Watered for two or three Days at the firſt, or ſo long until you find they have recovered their witherednes.

This *Crop* comes not to perfection until the third Year to take up, but the firſt Year you may Sow the Ground with *Onions*, *Lettuce*, or any *Sallet Herbs* that take not deep Root downwards; and afterwards keep the *Beds* and *Alleys* well *Hoed*, and clear from *Weeds*.

In *November* and *December* is the beſt Seaſon to take up the *Liquorice*; and obſerve that in the taking them up there will run from every Maſter Root a *Runner*, which runs all along the upper part of the Ground, which hath little *Sprouts* and *Roots*, which will yield excellent *Sets*, if they be cut three or four of them in every *Set*, and about four or five *Inches* long, which alſo Plant, being as good as the *Crown-Set*; and if it be a moiſt Seaſon, the Branches may be Planted betwixt the Set to thicken them.

In Planting the *Liquorice*, be ſure to have your Ground ready prepared before you take the *Sets* out of the Ground, for they will ſoon wither and be ſpoiled, and make all the poſſible haſt you can in Planting them.

Of TOBACCO.

THis is a very Advantageous *Plant*, and of great eſteem in this Age; it would grow very well in this Kingdom were it allowed, but by reaſon of its Prohibition, I ſhall not proceed to give Directions for the *Planting*, *Dreſſing*, *Ordering* and *Curing* it.

GARDEN-BEANS and PEASE.

BEANS are of ſeveral ſorts, and known by divers Names, as the *Windſor* and the *Sandwich*, which are the chief, and the largeſt are eſteemed the beſt; yet many are of Opinion that the middle ſized *Beans* (provided they are found) are the beſt, that is, they go fartheſt, there being the greater Number to fill the *Buſhel*.

Beans delight in a rich, ſtiff and deep Mould; good *Husbandry* ought to be uſed in digging the Ground well; the Seaſon to ſet them is from *Chriſtmas* to *Candlemas*, and alſo earlier or later, according to the Seaſon of the Year; but if too early, then great *Froſts* coming after they are Spired, will kill them; and if too late, they muſt be ſteeped in *Brine*, or ſuch Water, as before preſcribed for Steeping *Corn* in; and obſerve to ſet them very near when the *Moon* is in her *Wane*.

It is the common and uſual way to Set them here and there promiſcuouſly in Holes made with a *Dibber*; this way I do not approve of (as by Experience finding it not the beſt) but make *Ranges* with a *Hoe* about three *Inches* deep, very ſtreight, and let the *Ranges* run from South to North, for the greater benefit of the *Sun*, and this way they bear far more, the *Sun* and *Air* having a freer paſſage between them; alſo it is more commodious to go between them to Weed, Top, and gather them. You may Sow them thicker or thinner according to the goodneſs of the Ground, and your own Diſcretion; when they are ſown, with your *Hoe* raiſe up the Earth about them. Let the Ranges be about two *Foot* and a half, or three *Foot* aſunder; and that you may not loſe Ground, *Carots* may be Sown betwixt the *Ranges*, which will prove a good ſecond Crop. In gathering *Green Beans* it is not good to pull them from the *Stalks* as is uſual, for that prevents the thriving of the younger *Cods* not ripe, but cut them off with a *Knife*; and if you cut off the *Stalks* cloſe to the Ground when the *Beans* are gathered, 'tis probable you may have a Second *Crop* before Winter.

PEASE are of Sundry ſorts, *viz.* *Hotſpurs*, of which there are the *Barns Hotſpur*, the *ſhort Cod Hotſpur*, and the *long Cod Hotſpur*; they are uſually Sown in *November* and *December*, and ſometimes in *January*, they will be very early ripe provided the Ground is rich and warm; The *Sandwich white Peaſe*; The White, Grey, Blew, Green and *Maple Rouncival*; the large and ſmall White *Sugar Peaſe*; the Grey *Sugar Peaſe*; the *White Roſe* and the *Grey Roſe Peaſe*; the *Elg*, the *Wing*, and the *Sickle Peaſe*; the *Sugar Peaſe* which is to be eaten in their *Cods* like unto *French-Beans*, and by reaſon of their tenderneſs are to be Sown late.

Your Ground muſt be well ordered, if you expect a good *Crop*, eſpecially if it be *Plowzed*; and Sow them in *Ranges* made with a *Drill Plough*, or for want thereof with a *Hoe* indifferent deep, earthing them well over; and when they are come up, earth up the *Roots*, which is a great preſervative to them, eſpecially in a dry time, and keep them well *Hoed* and free from *Weeds*. Thoſe that have but ſmall quantities to ſet, and have the Conveniency of *Sticks*, may uſe them for the *Peaſe* to run upon, which doth occaſion a far greater encreaſe.

FRENCH-BEANS.

French-Beans, or *Kidney-Beans* are of three ſorts, *viz.* White, Speckled, and thoſe called the *Canterbury Kidney Bean*; the White is eſteemed the beſt. They are very tender at their firſt coming up, ſo that they muſt be Sown in warm Weather; *April* being a good Seaſon. To cauſe them to come up the ſooner, ſteep them in Water as aforeſaid. It is a very great bearer, and would be very profitable to Sow them for a ripe *Crop* for *Poultrey*; but the uſual uſe of them is for the *Kitchin*, being eſteemed a very good *Diſh*; and therein made uſe of ſeveral ways.

ARTICHOAKS.

THis is an excellent Plant, and very ſtrengthning; the Ground fit for them muſt be deep, and of a very rich *Soyl*, and Trenched up with *Dung* in the Winter, to make it the better, which will produce the larger *Choaks*.

The *Slips* that grow by the ſides of the Old *Stubs* ſerve for *Plants*, which are to be taken from them, and Planted in *April*, the Ground being well Dug; and they muſt be kept well watered until they have taken *Root*; and if they be ſtrong, they will bear Heads the *Autumn* following. They are to be Planted four or five *Foot* diſtance one from another, and kept well Weeded; and if the Summer prove dry, they muſt be Watered. This is a laſting *Crop* for divers Years, but your care muſt be to look after them in the Winter, to preſerve them from the pinching cold *Froſts*, by cutting the *Stalks* within about a *Foot* of the Ground; and raiſe up the Earth about them like unto *Molehills*, within two or three *Inches* of the top, and that covered over with long *Dung*, but do not Earth them up too ſoon, for fear of Rotting them: When the Winter is ſpent, uncover them, and lay them open by little and little, leſt the *Air* pinch them as being tender; then Trim them up very well, taking away moſt of their ſmall *Slips*, not leaving above three of the ſtrongeſt to each Foot for *Bearers*, and dig about the *Roots* as deep as conveniently you can, adding thereto good rotten *Dung*.

If you would have *Choaks* in *Autumn*, cut the Stems of thoſe that bore in the Spring, to hinder them from a ſecond *Crop*, and in *Autumn* theſe luſty Stocks will bear very good *Choaks*; but you muſt take away the *Slips* that draw the Subſtance from the Plants, and dig about them, dreſſing and watering them as occaſion requires.

JERUSALEM-ARTICHOAKS.

THeſe are much of the Nature of *Potatoes*, but are neither ſo toothſom, nor ſo wholſom, nor are they in any requeſt; they are planted of the *Roots*, or come of the *Seed*.

COLLYFLOWERS.

THis Plant is raiſed from *Seed*, which is ſown in *Auguſt*, and carefully preſerved in the *Winter*, being a tender Plant; or you may ſow them in the Spring in a *Hot Bed*, and remove them when they have indifferent large *Leaves*, and ſet them in good rich Ground, well prepared for that purpoſe; but the beſt way is to dig ſmall Holes about a *Foot* Square, and fill them with good rotten *Dung* mixt with rich Mould, and therein Plant the *Collyflowers* very deep, almoſt covering the Leaves, and be careful to water them

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them well, especially in a dry Season, otherwise they will not *Flower*. Let the *Holes* be about three *Foot* apart, and set in Ranges, to the end the Ground may be the better *Hoed*, and kept from *Weeds*.

CABAGES.

THere are divers sorts of *Cabages*, those most common are the *English*, the *Dutch*, the *Russia*, and the *Red Cabage*, of which the *English* and *Dutch* (which are generally very large and firm) are the best.

The Ground ought to be very good, rich, and of a deep Mould: and the manner of setting them is in *Holes*, as before directed for *Collyflowers*; They require Watering, especially at the first setting, until they draw *Root*: It is most convenient to set them in Ranges, at about four *Foot* asunder, if of a large kind, otherwise three *Foot* is enough.

The *Slugs* are very injurious to them, so that if they are not carefully looked after until they are grown pretty large, they will destroy them; therefore every *Morning* very Early, and every *Evening* about Sunset they should be pick'd off the Leaves, for at other times in the Heat of the Day they are not to be seen; Now to ease your self of this Trouble get a parcel of *Ducks*, and they will do that business, for the *Slugs* are good Food for them.

The *Cabage Seed* is to be Sown between *Midsummer* and *Michaelmas*, that it may gain Strength to defend it self against the pinching Cold, and in some Years the sharp *Frosts* kill them. The *Seed* is also to be Sown in a *Hot Bed* in the *Spring*, and then in *April*, or beginning of *May* they may be Transplanted into your Grounds, as before directed.

Many ordinary Grounds will produce *Coleworts*, and indeed if the *Cabage Plants* are not good, or if they be set too thick, they will turn to *Coleworts*.

These, as also the Offal Leaves of *Cabages*, are very good Food for *Cows* and *Swine*, so that were they Planted for no other use, it were beneficial enough. They are also excellent for *Rabets*, either Wild or Tame.

If you would preserve any *Cabage Seed*, let it be of the very best; and let them be placed very low in the Ground during the Winter Season, to preserve them from *Frosts* and Cold *Winds*, covering them with *Earthen Pots*, and warm Soil over the *Pots*, and at Spring Plant them forth.

SAVOYS.

THese are of two sorts, *Dutch* and *English*; they are in Season earlier than *Cabages*, and are more sweet: They are raised, and Planted much after the same manner as *Cabages*, but not so much Curiosity is required about them.

POTATOES.

THis is a *Root* in great Request in our *American Plantations*, as also in *Ireland*, no doubt but it will grow well in *England*, were it Planted here. They require good *Garden* Mould, and are easily encreased, for the *Roots*, if cut in small pieces, will grow as well as the whole *Roots*.

CAROTS.

OF this *Root* there are several sorts, *viz.* the *Red Carot*, the *Swelling Orange Carot*, which is the forwardest, and the *Yellow Carot*.

The Ground most agreeable for this *Root* is a light, warm and sandy Soyl, and withal rich in Heart. The usual way was to dig the Ground for them, which for small quantities for *Gardens* is the best; but of late Years the *Farmer* easeth himself of that great charge, by *Ploughing* it deep, which serveth as well; but it must be well harrowed and laid fine, otherwise it will be troublesom to *Hoe*, which is the chief care and charge required about it, for it must be three times *Hoed*, which will cost 30 *s.* an *Acre* to be well done; but those that *Sow* but a little for their own use, their *Gardiner* or other *Servants* may do it, being no difficult thing to learn; the chief care being to set them apart, for if two or more grow together, they will be small and come to nothing, and the cutting the Tops of them with the small *Hoe* kills the *Roots*.

There are two Seasons for Sowing *Carots*, one is about *February*, for forward *Carots*, and those will be ripe about the beginning of *July*; and the other Season is in *July* and *August* for Winter *Carots*, and those will be ripe and fit to draw in *October*.

These *Roots* are of great use, not only for the *Table*, but also for *Swine*, *Geese*, *Poultrey*, and *Rabets*. The best way to keep them all the Winter, is to lay them in dry Sand; and if you would reserve any for *Seed*, let them be the finest.

PARSNIPS.

THis *Root* delights in a deep, rich and Mellow Ground, which must be well dug, at the least a full Spit deep, and laid loose, the better to take *Root*. The Season to Sow them is in the Spring, to wit about *April*; And great care must be taken in the *Hoeing* them, as is for the *Carots*.

The *Swelling Parsnip* is by some preferred before the other. About *Christmas* is the time to draw them, and the Season holds all, or the greatest part of *Lent*. The fairest may be preserved for *Seed*.

This *Root* is of that Nourishment, that it will Fat *Hogs* with as firm a Flesh as with *Pease*; and those that have Experienced it say, that the *Flesh* is sweeter, and more delicate. *Carots* will also Fat them, but their Fat is loose, washy, and waists in the Boyling. *Parsnips* are also very good, being cut into small pieces and boyled for fatting *Poultrey*.

TURNIPS.

Turnips are of several sorts, *viz.* the long, the round and the yellow, of which sorts the long are esteemed the best.

This *Root* is more usually Sown in the *Field* than in a *Garden*, being generally a second *Crop*, with no more *Husbandry* than only giving the Ground, one stiring or *Plowing* after the *Crop* is taken off, and so Sowing the *Seed*, and Harrowing it well in. They must be twice *Hoed* to sever them, but that great exactness is not required as for *Carots*.

Besides the benefit of this *Root* for the *Table*, it is excellent good for *Cows* and *Sheep*, especially in hard *Frosty* Weather; And this *Crop* doth very much Mellow the Ground, and fit it for another *Crop*, being as good as a small Dunging; It is best to be Sown after a *Crop* of *Pease*, or *Beans*.

If you would raise good *Seed* whereby to have fair and large *Roots*, either of *Carots*, *Parsnips*, or *Turnips*, gather the highest Branches when the *Seed* is full ripe, which Sow in *March*, or *April*; and at drawing time choose the fairest *Roots*, cut off their Tops somwhat low, and set them again, and let them stand for *Seed* the next Year; which *Seed* take from the highest Top Branches, and Sow them in Season, and they will answer your Expectation.

SKIRRETS.

THis is a very sweet *Root*; it is raised of the *Slips*, and planted in the Spring Season in Ranges about five or six *Inches* asunder, and at Winter when you raise the *Roots*, you may lay the Tops in Earth until the Spring, for your further encrease. They delight in a very Fat and light Mould. If you would have the *Roots* of these *Plants* to be large, often tread down the Tops to hinder the Sap from runing up.

ASPARAGUS.

THis is to be raised from the *Seed* in a rich and fat Soil, and at two Years growth may be Transplanted into *Beds*; which must be rich, and well prepared with rotten Dung, about two *Foot* deep at the bottom; and also very good rotten *Dung* must be mixt with the Mould. Then set the *Asparagus Plants* at about two *Foot* distance, and three or four Rows in each *Bed*, which in time will extend themselves throughout all the *Bed*.

After three Years standing they will be fit to cut, but if you cut them sooner, they will be small. But your Ground may not be lost to you all this time; for the first Year you may Sow *Onions*, and may expect a good *Crop*.

At the beginning of Winter when the *Stalks* are cut away, pare up the *Alleys*, and cover the *Beds* with *Horse-Dung* about three *Inches* thick, which will preserve them from the Cold pinching *Frosts*, which otherwise will anoy them; and about Mid *March* uncover the *Beds*, and let the Dung lye in the *Alleys* to rot for good Mould against the next Season, and cast over the said *Beds* rich *Mould*, about Two or Three *Inches* thick, which will exceedingly nourish them and bring them forward and early.

Cut the *Asparagus* very low within the Earth and it will grow up the better; but be careful, of cutting those that are just peeping up, for that will hinder their growth.

If you take up the *Roots* of old decayed *Asparagus* about the begining of *January*, and Plant them in a *Hot Bed*, keeping it warm and sheltering it from the *Frosts*, you may have *Asparagus* about *Candle-mas*.

MELLONS.

MEllons are very troublesom and costly to raise; about the Middle of *February* make your *Hot-Beds* in some enclosed place that is sheltred warm from the Wind by a *Pail* or *Fence* of *Reeds*, or *Straw*, which *Hot-Bed* must be made of good new *Horse-Dung* Five or Six *Foot* high and about Four *Foot* broad, and very hard trod or beat down; then sift some pure *Mould* of last years rotten *Dung* without any mixture of Earth, about Four or Five *Inches* thick, and put in the *Seeds* with your *Fingers* at Two or Three *Inches* distance, and an *Inch* and an half deep; then cover them over with *Mellon Glasses*, the better to draw up the heat, and bring up the *Mellons*; and this way is better than the covering the *Bed* with *Straw*, or *Mats*, raised or supported up by Arched *Sticks*, which is the common way to those that cannot, or will not be at the charge of *Glasses*.

When the *Plants* begin to peep up, cover them thinly over with Fine warm *Mould*; and when they are shot above Ground, cover up the Stalks close to the *Leaves*, and in the heat of the Day give them a little Airing, taking off the *Glasses*, but casting a little *Straw* over them for fear the *Sun* proves too hot for them, and this do about Ten a Clock to a Eleven, and open them again about Two till Four; and as the *Plants* rise, raise up the Earth to the Roots to succour them, and when you find the *Bed* begin to decay, remove the *Plants* into another *Hot Bed*, otherwise they will decay for want of Heat; but coming into a fresh *Bed* will mount up apace; If the *Bed* grows dry, Water them once in Twelve Hours with Water made Luke warm: When the *Plants* are grown pretty big remove them into another new *Bed*, and *Plant* them, about Four *Inches* asunder; Then *Plant* them where they shall stand all the Year: dig a large *Trench* about Four *Foot* deep, and Three *Foot* over, and place therein some *Dung* about Three *Foot* deep, that will heat them; then make a square Hole about Four *Foot* deep, and half a Yard square, and fill it about half full with very rich *Mould*; Then take up the *Mellon-Plants* from your last *Bed* very carefully, and set Three *Plants* in one Hole Triangular in the warm *Mould*, so deep, that the *Leaves* may be level with

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with the Top of the Earth; then set the *Glasses* upon them, and cover them very warm, and Water them with *Dung-Water* Blood-warm for Three or Four Days after the planting, and be sure to give them good attendance in the time of their ripening, for the excellency is to take them in their prime, and they will soon be over ripe: Lay the young *Mellons* upon ridge Tiles to to keep them from the Ground, and to cause the reflexion of the *Sun* the better.

CUCUMBERS.

Cucumbers are raised in *Hot-Beds*, and from thence transplanted as *Mellons*; but the more usual way is to make a *Trench* of a sufficient bigness for the quantity of *Cucumbers* you design to sow, and fill it with new *Horse-Dung* and make square *Holes*, as before directed for the *Mellons*, which fill with rich *Mould*, and set the Seeds about Two *Inches* deep in it, and put about Twelve in a *Hole* dispersed up and down; when they come up cover them with *Straw, Cabage-leaves*, or *Mats*, to shelter them from the Wind and Weather, until they are pretty Big, and then they will be out of danger; but forget not to water them, especially in a dry Season. About the latter End of *March*, or begining of *April* is a good time to set the *Seeds*; and if you would have them earlier you must make use of *Hot-Beds* and *Glasses*.

Cucumbers are of Three Sorts, *viz.* long, short, and prickly *Cucumbers*.

POMPIONS.

These *Roots* are set in good *Mould* after the manner of *Cucumbers*, and must be well watered at their first appearing: When you perceive a *Pompion* to be kerned, and Grown pretty big, and that the *Runner shoots* forwards and produceth another about a Yard beyond it, lay the Runner about half a *Foot* in the Ground and it will shoot out *Roots* and nourish the other *Pompion*, for that next the *Root* intercepts all the Sap from the other, so that in Two or Three Days it will pine away: and observing this Rule you may have Nine or Ten upon a *Root*, otherwise not above Two or Three.

MEKINGS and *GOURDS* are not much unlike unto *Pompions* and require the same ordering.

Of *Onions*, *Leeks*, *Garlick*, *Shalots*, with *Sallating* and *Potherbs*.

ONIONS are of several Sorts, *viz. Strasburgh Onions*, the *Red Spanish*, and the *White Spanish*, the *French* that comes from St. *Omers*, and the *English Onion*.

They delight in a fine, fat and warm Mould; they are sown in *March*, or begining of *April*; If they are not sown with an even Hand they will be in some places too thick, and in others too thin; then where they are too thick let them be drawn up and planted in the thin places: When they are grown to some reasonable bigness bend down the Blades, which will make the Heads the larger. They must be kept well weeded, otherwise they will not come to good perfection.

In *August* they are usually ripe, then gather them up, and lay them in the Sun to dry on a *Blanket*; then make them up in *Ropes* and hang them up, or lay them on some boarded Floor for your use.

The *Strasburgh* is reckoned the best.

LEEKS.

Leeks are of the nature of *Onions*, and are so sown, but when they are grown big, if they were transplanted and set deep in the Earth they would have the more white *stalk* for use, but this is too great a trouble for any quantity.

The fairest and best *Leeks*, as also *Onions*, are to be kept and planted for *Seed*, and by reason of weightyness of their Heads they are to be propped up with Sticks; when the *Seed* is ripe, cut off the Heads, and lay them to dry, then rub out the *Seed*.

GARLICK and SHALOTS.

Garlick is set in rich Ground; one Head being severed into *Cloves* will set a small *Bed*. *Shalot* is to be set in rich Ground, but this and *Garlick* may be raised from *Seed*, as the *Onions*, and so ordered

Seeds necessary for the Kitchin.

There are divers *Seeds* necessary for the *Kitchin*, the sowing and propagating of which, being so easy, I shall not trouble the Reader with a Discourse of each particular Part, only say that they are to be sown for the generality in the *Spring*, and the Ground must be of a rich and Mellow Mould, and well husbanded by diging and laying into *Borders*.

As near as you can, let not the *Seed* be above a year old; and to trye if it be good, put some thereof into a *Saucer* of fair Water set over a *Chafindish* of *Coals*, and if they be good they will sprout forth in a short time, else not. Also new *Seed* is of a brighter Colour than that which is old.

For sowing the *Seeds* being so small, the best way is to mix them with fine *Ashes*, and that the Ground may lie the better, let it be finely raked, and then sow the *Seeds*; and having good fine *Mould*, sift it through a *Sieve* on the *Beds*, about half an Inch thick, which is far better than to sow them, and so rake the Ground afterwards.

These *Seeds* I shall divide into four several Heads, viz. *Sallad Seeds*, *Pot-herb Seeds*, *sweet-herb Seeds*, and *Phisical Seeds*.

SALLAT SEEDS are *Radishes*, which are of Four sorts, viz. *London*, *Sandwich*, *Black Spanish*, and *White Spanish Radish*. *LETTUCE*, viz. the *Curld*, the *Red*, the *Rose*, the *Savoy*, the *Roman*, the *Lombar*, and the *Cabage*. *SPINAGE* the round and the prickly. The White, the Red and the *Roman Beet*, *Sampier*, *Berry-bearing Orach*, *Italian Selleree*, *Fœnochio Rocket Spanish Rocket*, *Rampion*, *Hartshorn*, *Taragon*, *French Sorel*, *Candy Sorel*, *Cardoon*, *Indian Cresses*, *Garden Cresses*, *Broad leaved Cresses*, and *Curled Cresses*, *Chervil*, *sweet Chervil*, *Purslane*, *golden Purslane*, *Parsley*, *curld Parsley*, *Alisander*, &c.

POT-HERB SEEDS, *Endive*, *Succory*, *Borage*, *Bugloss*, *Burnet*, *Bludwort*, *Clary*, *Sorrel*, *Marygold*, *Pot Marjoram*, *Summer Savory*, *Colombine*, *Tansey*, *Nep*, *French Mallows*, &c.

SWEET-HERB SEEDS are *Thyme*, *Hyssop*, *Winter Savory*, *sweet Marjoram*, *sweet Basil*, *Rosemary*, *Lavender*, *Baum*, *Fennel*, &c.

PHISICAL SEEDS are *Carduus-benedictus*, *Scurvy-grass*, *Angelica*, *Lovage*, *Smallage*, *Dill*, *Carraway*, *Cumin*, *Anise*, *Coriander*, *Gromil*, *Henbane*, *Flea*, *Fœnugreek*, *Rubarb*, *Burdock*, *Elecampane*, *Balsam*, *white Poppy*, *Cardemum*, *Gourd*, *Citrul*, *Worm-seed*, *Wormwood*, *Rue*, *Oculus Christi*, *Line*, *Marsh-Mallows*, &c.

Thus having given you a short Account of divers sorts of *Seeds*; In the next place it will be convenient to give some directions for the watering them which is the chief preservative in a dry Season.

It is better to water a *Plant*, or *Seeds* seldom and throughly, than often and sparingly, for that is but a deceiving it, and causeth it to root not so deep as otherwise it would, and by consequence makes it the more obvious to the Weather.

If the Weather be never so dry when you Sow your *Seeds*, do not Water them until they have been in the Ground some Days, and the Ground be a little settled about them.

Pond, or *Rain-Water*, is esteemed the best for the Watering *Plants*, or *Seeds*, and is preferred far before *Spring*, or *River Water*.

Many curious *Plants* and *Seeds* would suffer, were they not carefully Watered at the first Removal, or in the dry Seasons; therefore 'tis not to be neglected: Early in the Spring (whilst the Weather is cold) be cautious to Water the Leaves of the young tender *Plants*, only wet the Earth about them: When the *Plants*, or *Seeds*, are more hardy, and the Nights yet cold, Water them in the Forenoon; but when the Nights are warm, or the Days very hot, then the Evenings are best.

Directions for drying Herbs, and preserving Seeds.

Gather them in their Prime, pick them clean from the withered and rotten Leaves; then tye them up in small Bunches, and hang them on *Lines* in the *Wind* and *Sun* to dry, but where no Rain comes, for that will make them look black, and also take away their *Scent*: When they are sufficiently dryed, put them in brown Paper-Bags, and so hang them up in convenient dry places against the *Walls* to keep for your use; and if you lay them before the Winter comes in, the *Sun* for a few Hours will much refresh them.

Then for the preserving the *Seeds*, let them be gathered when they are through Ripe, and laid to dry in the *Sun*; then rub them out, and cleanse them from the Dust, and so preserve them for use.

Besides, the aforesaid *Herbs* raised from *Seeds*, there are divers raised from *Sets*, or *Slips*, and such are *Mint*, *Sage*, *Hysop*, &c.

Of Goosberries, Currans, Rasberries, and Strawberries.

GOOSBERRIES and *CURRANS* are much of one nature, and the same *Husbandry* that is required to the one is to the other: They must be planted in good rich Ground, and of a deep and light Mould. You must keep the Ground in good heart, by Soyling it at least every third Year; and keep it dug, and well Hoed, to Be free from *Weeds*, which are great Enemies to them: Also keep the *Trees* clear from *Succors*, or young *Shoots*, by cutting them off close to the Root; and suffer not a Bushy thick Head, for that will hinder the *Suns* influence to Ripen the *Fruit*, nor will they bear so well, nor the *Fruit* be so large as if thus trimmed and ordered.

If you plant either *Goosberries*, or *Currant-Trees*, for a full Crop, four or five *foot* square is enough, and be sure to plant them in even Ranges, which is better for the *Digging*, *Hoing*, *Gathering*, and all occasions.

There are several sorts of *Goosberries*, as the *English*, both White and Red; the Yellow and White *Dutch Amber*, which are the best and faireſt *Fruit*.

CURRANS are of three sorts, the *Red*, the *White*; and the *Black*; which as yet is not common.

RARSBERRIES are an excellent *Fruit*; They delight in a good stiff Ground, and will grow in the Shade, but then the Fruit is not so good and pleasing to the *Pallate*, being more watersish. They are best set in *Beds*; and if the Plants are set about a *foot* asunder they will soon be too thick, by reason of the great store of *Shoots* that spring up.

In the Winter let the *Borders* be Pared, and the Earth cast up on the *Beds*, with *Dung* over them, which will very much nourish the Plants, and cause them to bear the better, and keep the Beds clear from *Weeds*.

STRAWBERRIES are also of several sorts, *viz.* the great *White Strawberry*, the ordinary *Red* one that grows in the *Woods*, and the *Virginia Strawberry* of late years brought into *England*, being a large *Berry*, and of a delicate taste, far exceeding the *English*.

They delight to be set in new broken Ground, or at least where they have not grown before, and should be removed every third Year, otherwise they will decay and cease bearing; so that they must be removed into fresh Ground well prepared, and rich: But *Wood-Strawberries* are found to prosper best in *Gardens*. The *Beds* may be about four *Foot* broad, and not too thick set, for they will soon spread: Let them be kept clean Weeded, and in the Winter pare the *Borders*, and cast the Earth on the *Beds*; with

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some *Dung*, as before directed, for *Rarsberries* to nourish them.

Watering them, especially in the hot, dry Weather, doth cause a great Encrease, and makes the *Berry* the larger.

If you would have *Strawberries* in *Autumn*, cut away the first *Blossoms* that they put forth, to hinder their timely Bearing, and they will Blow anew, and Bear in *Autumn*.

Thus having treated of the *Kitchin-Garden*, the next business shall be to speak of the *Garden of Delight*, for *Flowers, Greens, &c.*

CHAP. VI.

Of Flowers, and how to Raise, and Order them.

GArdens for *Delight* are of two sorts, *viz.* producing *Flowers* from *Stalks*, and *Flowers* from *Trees*; under which Head all *Greens* are comprehended.

The most graceful Grounds for the *Garden* is a Level; and for a *Soyl*, neither a *Sand* nor a *Clay*, but a good deep light Black Mould, which must be made rich with Soyl: But if the Ground is not upon a Flat, the best way is to divide it into parts with Descents, as the place will admit of, and for the laying it out into *Walks*, *Beds*, and the like; If your own Ingenuity will not perform the said Undertaking, 'tis convenient to have the assistance of one Expert therein, to the end your cost and labour may be effectual, and that you may not wish it were to do again.

These *Gardens* are not good to be too big, for then requiring so much Cost and Attendance to look after carefully, 'tis probable many things will be neglected; which if but small, would be exactly kept, and according to the Proverb, *A little well done, is better than a great deal ill done.* Also great care ought to be taken in the *Walks*, that they be of good Workmanship, have a good Foundation and Thickness, that the high *Wind* may not blow them down; and for Height, about nine or ten *foot* is sufficient, and under is too low: And *Brick* is far better than *Stone*, which is too cold for *Fruit* to ripen against (to that perfection) as against a *Brick-Wall*. *Pailing* (provided the *Boards* are whole *Deals*, and laid over one another *Featheredg*-wise) is very good, and more kindly than a *Stone-Wall*.

Fruits proper to be planted against the *Walls*, are *May Cherries*, *Apricots*, *Peaches*, *Nectorins*, *Pears*, and *Vines*; all which require a South *Sun*, so that the North-side is best next to the East; the West is indifferent good, as having the Morning *Sun*; but most fit for *Plumbs*, as the South side is, which is fit for nothing else.

These *Trees* may be planted at about ten *foot* distance, and between each may be set *Curran-Trees*, to fill up the vacant places until the *Trees* spread forth, and require the said place, and then they may be cut up; and in ordering the *Branches* along the *Wall*, lay them low within a *foot* of the Ground, for when the *Boughs*, or *Branches* are well dispersed, and that there is no vacant places, it is an handsom sight to look upon; and above all things be sure to make the *Borders* (where you plant the *Trees*) very rich, which will extreamly bring forward the *Trees*.

To fill up the *Borders* set *Auricula's*, *Wall-flowers*, *Stock Gilly-flowers*, *double Violets*, *Hipaticaes*, *double Pinks*, *&c.*

As for the laying out your *Garden* into *Walks*, *Borders*, and *Graß-Plats*, some few Directions shall suffice, every one having a Form to his own liking.

For *Graß-Plats*, let them be of *Turf*, and taken from the Barrenest and Hungryest Ground, provided the *Graß* is thick and short, for that which groweth Rank is not so good. Let the Ground be exactly made Level, then lay the *Turf* close together, beat it well with a heavy Beater, and be not slack in Watering it for some time, until it is setled to the Ground.

For *GRAVELLING* the *WALKS*, lay the *Gravel* thick, the Coursest at the Bottom, and the Fine at the Top, which should be Screned, and let the Middle be highest, with a gentle descent on either side. It is now the fashion to lay on the Top of the Walks *Cockle-shells* instead of *Gravel*, which is far better, and not very chargeable.

The *Walks* must be kept well *Rolled*, and the *Graß-Plats* well Mowed and Rolled, to keep them smooth and handsom.

Worms are great Eye-sores to *Walks* in casting up the *Earth*, for preventing which, it is good to strew amongst the *Gravel* good store of *Bay-Salt*.

It is now customary to set in the *Borders* that encompass the *Graß-Plats Dwarf Fruit-Trees*, as *Pears*, *Apples*, and *Cherries*, which are generally of the best and choicest Fruits growing, and you may have two or three sorts upon one Stock. They may be planted about ten or twelve *foot* asunder, with an *Apple*, or *Pear-Tree*, betwixt a *Cherry*; and betwixt the said *Trees* may be planted *Roses*, *Currans*, *Gooseberries*, *Cypress-Trees*, *Misserions*, and the like; and the rest of the *Beds* may be set with *Tulips*, *Daffadillies*, *Lillies*, *Yionies*, *Martagons*, and the like; and about the Edges of the *Beds* double *Pinks*; or else *Box*, which being always Green is pleasant to behold; the only fault is, it eateth out the heart of the Ground, so that you must keep it always Soyling.

EVER-GREEN HEDGES are very Ornamental; the best are made with *Pyracantha* and *Phillirea*, as much of the one as the other, equally dispersed; and for lower in small Gardens, *Celastrus* and *Alaternus*. For the raising and setting of these *Plants* more anon. These *Hedges* must be kept orderly, cut Even on the Top and Sides, and not too Broad.

Your

FLORA
To the Rt Hon: Richard
of the Kingdome of Scotland
most Hon: privy Councell
son to the Rt Honourable
This Plate is humbly Dedicated
Courtio et amni
Lord Maitland Lord Justice Clarke
one of the Lords of his Maty
in that Kingdome and eldest
Charles Earle of Lauderdale
by Richard Blome

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Your *Garden* cannot be compleat, if the *Borders* are not bounded in with *Border-Boards*, which should be laid in *Oyl* for lasting, and Coloured for Ornament, with handsom round *Balls* placed at equal distances on the said *Border-Boards*, which may be coloured Black, and the *Boards* White.

A *Summer-House* is requisite to be erected in some convenient place of the *Garden*, which may be made of Framed *Timber-Work*, covered over at the Top; and for curiosity of Workmanship in the said House in *Carving* and *Painting*, it is left to your discretion.

The *Summer Season* being generally dry, the *Flowers* require frequent Watering, so that there should be the conveniency of a *Well*, or *Fountain*, and if Pumped out of a *Well*, a *Cistern* is necessary; for the *Water* should stand some time in the *Sun* before it is fit to be used on tender *Plants* and *Flowers*.

For the maintaining and keeping up your *Garden*, a *Nursery* must be in some convenient place adjoyning to your *Garden*, where not only *Stocks* for *Fruit*, but *Flowers* raised by *Seeds*, *Slips*, and the like: And here your *Hot-Beds* should be for the Raising of choice *Annuals*, to be transported into your *Garden*.

In this *Nursery* should be some convenient House raised against the Side of the *Wall* for the Housing your *Greens*, and tender *Plants* that are in *Pots*, as *Gilly-flowers*, &c. which the cold Winter will kill; as also to keep your *Garden Tools* in that they may be ready at hand on occasion, as *Hoes*, *Rakes*, *Spades*, *Shevels*, *Garden-sheers*, *Pruning-hooks*, *Grafting* and *Inoculating Knives*, *Trowels*, *Saws*, *Chissels*, *Mallets*, *Hammers*, *Nails*, *Garden Reel* and *Line*, a *Screen*, a fine *Wyer Riddle*, *Brooms*, *Watering Pots*, *Wheel-Barrows*, and the like *Tools*.

In your *Nursery* there should always be a Stock of old *Dung* of several sorts, each laid by it self to be used as occasion requires; for if the Ground be Hot and Sandy, *Cow-Dung* mixt with *Lime* is best; and if cold and Clayey, then that of *Horses*, *Pigeons*, or *Poultrey*.

Now forasmuch as *laying* of *Branches*, planting by *Cuttings*, *Budding*, and the *Hot-Bed*, are in great use: It will be necessary to speak a word or two of each.

Laying of JULY FLOWERS, is thus done; chuse such *Slips* that are strongest, prune off the ends and sides of the Top Leaves, and under the middlemost joynt cut the Stalk half through, and slit it upwards to the next joynt; then make a Hole in the Earth, and gently bend it down thereunto with a small hooked Stick to keep it from rising; then turn up the Head of the Slip, that the slit may open, in which posture hold it with one Hand, and Earth it up with the other, pressing it down to keep the slit upright, then water it.

There are some good *Slips* that grow so high from the Ground, that they can't be laid; in such case you must make use of small *Pots*, that have slits in one side made on purpose, and sold by *Potters*. These *Pots* are to be fitted with good *Mould*, and kept well watered.

The best Season for laying of *July-flowers* is from Mid *June* to Mid *July*, and about the beginning of *September* they may be taken off with the Earth about them, and set in *Beds* or *Pots* fitted with good *Earth*. Place these *Pots* in the shade, sometimes gently watering them, but not too much; and to preserve them from great *Rains*, shelter them in *Paint-Houses* made of *Boards* for that purpose.

For the laying of *Jasmines*, *Roses*, *Greens*, and other *Woody Plants* after directed to be raised by *Layers*, make choise of such a *Branch* or *Launce*, that may easily be bended to the Ground; the same Years *Shoots* are the best for Rooting; cut it half through on the underside at a *Joynt*, or Knot, if it have any, then slit the same upward two or three *Inches* long, and prick the Bark through with a blunt pointed *Awl* in divers places about the slit: Take off the Tops of all *Laid Plants* except *Greens*, then make a wide Hole to hook it down, and follow the Directions as for *July-flowers*.

Such *Plants* that will not take *Root*, let the upper end of the slit be bound very hard with *Wyer*, or *Packthread*, which will stop the Sap, and cause it to grow; and put some Rich Fat Earth about the place where they are layed

The best time to lay *Greens*, or other *Plants* is about Mid *August*, that they may have taken Root by the *Spring*, and the next Year will be fit to take off, as being well Rooted; and to cause them the better to Grow, water them often.

CUTTINGS are to be taken as soon as the Sap begins to rise: They must be cut slooping from a Joynt or Knot at the lower end, and left about a *Foot* long: Make a deep *Trench* and lay them therein a little slooping, fill the *Trench* with good *Mould*, and press it hard down, and often watered.

As for *Budding*, or *Inoculating* of *Roses*, it is performed after the same manner as for *Fruits*, of which more hereafter.

HOT BEDS are used for raising up of forward *Plants*, &c. and how to make the *Beds* is already Treated of in the fifth *Chapter*, concerning *Mellons*.

If you remove any Rooted Plant of *Flower* or *Herb*, although it be in the midst of the Summer, if you remove them in the Cool of the Evening, and well water them, taking all the Earth about the *Root*, without loosening it from them there is no danger.

Should I make a Discourse of each particular *Flower*, and the great Variety of each sort, it were enough to make a Volum of it self. Mr. *Rea*, a great *Florist*, hath Published an elaborate piece of this kind, Entituled *Flora*, *Ceres* and *Pomona*, wherein he hath Treated of each particular *Flower*, as also of the *Greens*, as well those bearing *Fruits* and *Flowers* as otherwise. I shall therefore give a short Account of the Names thereof, and refer you to the Book it self.

Mr. *Rea* begins his Discourse of *Flowers*, with those that have either *Scaly*, *Bulbous*, *Grumous*, or *Tuberous Roots*, from whence the *Leaves*, *Stalks* and

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and *Flowers* do annually Spring, moſt of them dying even to the *Root* ſoon after their *Flowring*. And firſt with the *Lilies* and *Martagons*.

Of LILIES.

THe *Crown Imperial*, the *Double Crown Imperial*, the *Tellow Crown Imperial*, the *Narrow Crown Imperial*, with a reddiſh Flower. The *Perſian Lily*, the red *Lily*, the *fiery red bulbed* Lily, *the double red Lily*, the yellow *Lily*, the white *Lily*, the white *Lily* of *Conſtantinople*, the double white *Lily*.

MARTAGONS.

THe *Mountain Lily* or *Martagon*, the *Martagon* Imperial, the white *Martagon*, the white ſpotted *Martagon*, the ſpotted *Martagon* of *Canada*, the *Martagon* of *Conſtantinople*, the red ſpotted *Martagon* of *Conſtantinople*, the *Martagon* of *Hungary*, the *Virginian Martagon*, the *Martagon* of *Pompony*, the yellow ſpotted *Martagon*, and the yellow *Martagon* without Spots.

All theſe ſorts of *Lilies* and *Martagons* flower in and about *June*, and are all, except thoſe of *Canada* and *Virginia*, ſtrong and hardy Plants and great Encreaſers.

FRITILLARIES.

THeſe are of two Species, the one with ſmall *Roots*, ſharp pointed green *Leaves*, and large *Flowers*; and the other with bigger *Roots*, round pointed whiter green *Leaves*, and different faſhioned ſmaller Flowers, and of each kind there are ſeveral ſorts, *viz.*

The Common *Chequered Fritillary*, the double *Buſh Fritillary*, the white *Fritillary*, the yellow *Fritillary*, the darkred *Fritillary*, the great red *Fritillary*, the great yellow *Fritillary*, the ſpotted yellow *Fritillary*, the great yellow *Italian Fritillary*, the ſmall *Italian* yellowiſh green *Fritillary*, the exotick narrow leaved *Fritillary*, with a whitiſh green double Flower, the ſmall yellow *Fritillary* of *Portugal*, the black *Fritillary*.

Theſe do *Flower* about the end of *March* and beginning of *April*. The *Roots* loſe their Fibres as ſoon as the Stalks are dry, and may then or any time after before *Auguſt* be taken up, and kept dry for ſome time; but not to be kept longer out of the Ground than Mid *Auguſt*.

TULIPS.

THere are innumerable many ſorts of *Tulips*, all which are (or may be) comprehended under three ſorts, *viz.* the Early, the Middle, and the latter Flowring *Tulips*, of which in order.

The Early Flowring *Tulips* are the *Winter Duke*, *General Duke*, *General Brancion*, pretty *Betty*, Duches *Brancion*, *Lac Varine*, *Violet Ratgans*, *Violet de Remow* or *Purpure Liſſe*, *Palto van Leyden*, *Floriſante*, *Religious*, *Blindenburgh*, *Nonſuch petits late*, the *Corn Heart*, *Admiral Crinki*, *General Molſwick*, *Cleremont*, *Paragon Cleremont*, *Admiral Encuſen*, *Morillion Cramoſine*, the *Noble Aurora*, the *Early perfect*, *Piriſbot*, *Princeſs*, *Fair Ann*, the *Omen*, the *Marqueſs*, *Vice-Roy*, *Galatea*, *Maria*, *the Superintendent*, *Auraro van Bart*, *Paragon Grebert*, *Gilden Blome Brentel*, *Gilden Blome Seonie*, *Alcetus*; *Unique of Delfe*, *Vgenia*, *Climene*, *Clitus*, *Venetian*, *Retrocede*, *Dorade*, *Witten Root Hodie*, *Bonaventura*, *dos de Chamoy*, *Paragon Iſeraut*, *purple and white Evers-Wind*, *Brus Moreſco* &c.

The Middle Flowring *Tulips* are, the *Swiſh* of *Portugal*, *Munera*, *Semper Auguſtus*, the Prince of *Orang*, General *Eſſex*, *Pluto*, *Paſs Endinard*, *Paragon oudinard van Bole*, *Agot Morine*, *Agot Robine*, *Agot Robine Paragon*, or *Robinet*, the white *Agot*, *Tudart*, *Jaſper Tudart*, *Harvy*, *Admiral vander Pool*, *Morillion*, *Nacarat*, *Cardinal Flambiant*, *Prince Cardinal*, *Mirillion de Anvers*, *Orient Virgin*, *General Gwda*, *Envy*, *Triumphans*, *Bow Turnier*, *Bell la Bar*, *Bell Breire*, *Bell Brune*, *the Cardinal*, *Veſta*, *Royal Veſta* or *Non pare*, *Mazarine*, *Sattine*, *Morillion de Argiers*, *the Pearl*, *Bien venu*, *Admiral Cataline*, *Suſanna*, *the Pelican*, *Belline*, *Paſs Belline*, *General Sweman*, *Camuſetta*, *Paragon Franſwiſe*, *Admiral of France*, *Benedictine*, *Paragon Blackbam*, *Paragon de Gildon*, *Dautile de ſlure*, *Paſs Roſie*, *Roſilliante*, *Holofernes*, the *Chimney-Sweeper*, *Turban*, *Admiral Heart*, *Zealom*, *Cedo Nulli*, *Lauſcot Bole*, *Alles Royal*, *Zweman*, *John Garet*, *or Chamolet*, *Paragon Liſgen*, the *Parot*, the *Rich Parot*, *Agot Rampard*, *Agot Gekeire*, *Star de Mans*, *Marvelia de Quacle*, the *Preſident*, the *Royal Preſident*, *Noſte la perfeit*, *Pompeza*, the *Eagle*, *Eminentiſſime*, the *Royal Agot*, *Agot Oriental*, *Paragon-Floriſon*, *Morillion-Curtiis*, *Admiral de Mans*, *Jacobea rectified*, *Paragon de Coſta*, *General of Holland*, *La Towers*, *Bell pallas* of *Paris*, *Paſs bel Tew*, *Marbre Jeſper*, *Agot poit vin*, white *paſs Cittadel*, *Dorile*, *Carthage*, *Diana*, *Diſpute Doria*, *General Doctor Boleſom van Bole*, *Otter*, *brown Purple Cataline*, *Paſs Heron*, *Violetta*, the *Flanders Widdow*, *Princeſs Royal*, the *White Widdow*, *Prince of Wales*, *Princeſs*, *Turgiana*, *Ariana*, *Rundelo*, *Brown Anvers*, *Bew Anvers*, *General Anvers*, *General Bole*, *Paragon Geron*, *Dorothy of Holland*, *Carolus*, *Volverte*, *Paſs Zealon of Paris*, *Brown Purple de Marris*, *Agot Hammer*, *Agot St. Denis*, *Brabazon*, *Hiſpaniolet*, *Agot de Gorier*, *Arch Duke Imperial*, *Le Arch de Auckre*, *Amphitrio*, *Armiante*, *Conſtergi*, *Althea*, *Atlas*, *Paragon Alette*, *Sigiſmond*, *Unick la Croy*, *Jacobine*, *the Brown Purple of Marris*, *the Brown Purple Paragon*, *the Brown Purple Blaſſack*, *the Brown Purple King*, *and the Brown Purple Prelate*.

Other good *Tulips*, viz. *Amarantine*, *Atlas Aurora Celeſte*, *Bellincourt*, *Borimda*, *Brabazon Elſerier*, *Brabazon Hugh van Hij*, *Cardinal Mazerine*, *Celeſtine*, *Dulcina*, *Dutcheſs of Venice*, *Eliza*, *Fauſtina*, *Finetta*, *Flenricourt*, *General Picot*, *Herculeſ*, *Jaſper Angloice*, *Jacobine*, *Imperial*, *la Conſtante*, *la valles Mahomet*, *Melinda*, *Mirandola*, *Morillion Chirar*, *Monſter Cytroon Parat*, *Morine*, *Oriental*, *Non plus bella*, *Paragon Aletta*, *Paragon*, *Hellena*, *Paragon Buſs*, *Paragon Quacle*, *Paragon Gowda Quacle*, *Richmont*, *St. Nicaiſe*, *Sigismont*, *Speciosa*, and *Turney Dolphin*.

Admiral de Groot, *Admiral van Zierchee*, *Admiral Lifebrews*, *Admiral Sierchee*, *Beline*, *Camillus*, *Dorillies*, *Daphne*, *Dorothea Paragonee*, Duke of *Calabria*, *Dan Frederick*, *Emillia*, *Floridort*, *Gallard*, General *Hannibal*, General *Pump*, *Hardges*, *Jacaſta*, *Keremi*, *Luxemburg Paragonee*, *Metander*, *Nonſuch*, *Orinda*, *Paragon Veſta*, *Paragon Orapt*, *Paragon Sheldenburg*, *Paragon paſt Marmillion*, Queen *Elizabeth*, Queen of *France*, *Rechelu*, *Shdon Hellena*, *Timon*, *Victoria*, *Venus*, *Wigons*, *Paragonee*, *Xenophon*, *Youngſter*, *Zeablon*, *King*, *Zelot*, and *Zacaria*.

Other ſorts *Tremontane*, *Proteus*, *Amidore*, *Brown Georg*, *Agot Pigot*, *Aurora*, *Clytus*, *Agot Bizar*, *Rich Portugal*, *Memorables*, *Proſerpine*, the *Curle*, *Eremanthe*, *Cleomedon*, *la Billy*, *Clelia*, *Zelinda*, *Phenix*, *Charmante*, *la Fine*, *Amazon*, *Swiſſiſs*, and *Philadelphia*.

The latter Flouring *Tulips*, viz. *Pato Madam*, the *yellow Crown*, *Prince de la More*, the *Zerotine Zeoblom*, *Grefound*, *Star of Venus*, *Paragon Mullen*, *Agot Romane*, *Marbre Harlus*, *Tenebris*, &c.

The *Roots* of all *Tulips* loſe their *Fibres* every Year, and are to be taken up ſo ſoon as the *Stalks* are dry, which is about *Midſummer*, and muſt be kept dry on the board of ſome Room until ſetting time, vvhich is about the beginning of *October*.

The *Roots* in light Ground may be taken up with the Hand, but in ſtiff you muſt uſe a *Trowel*; and thoſe that are curious, lay every ſort by it ſelf on Papers, and write the Names thereon; and you muſt take away the dead *Fibres*, and the looſe outward *Skins*, as alſo the Off-*Sets* or *Roots* to ſet again.

The beſt *Tulips* ſhould be ſet by themſelves in good prepared *Beds*, and the ordinary ones may be diſpoſed of in *Borders*; but ſo diſperſe them that there may be a handſom mixture of Colours.

After the *Flower* is ſhead break off the *Head*, or *Seed-Pod* from the Stalk, unleſs of ſuch that you intend to keep for *Seed*, which will cauſe them to dry down the ſooner, as alſo to fortifie the *Roots*.

Thoſe that are deſigned for *Seed*, are to be made choiſe of when in the prime of *Flower*; chooſe the ſtrongeſt *Stalks*, ſuch as have the moſt benefit of the Sun, and ſuch as have the *Bottoms*, and *Tamis*, either blew or purple.

When the *Seed* is ripe the *Pods* will open, and the Stalks will be dry; then gather them off, but rub not the *Seed* out until about the end of *September*; then ſow the *Seed* in *Beds* of fine *Mould*; In *April* the *Seeds* will come up high enough to *Weed*, and about *Midſummer* (two years after the ſowing) they may be taken up, the Roots cleanſed, and ſet in Rows at a wider diſtance; and ſo every year until they come to bear *Flowers*, ſtill altering the Ground with rich, and freſh Earth; Thoſe that prove excellent, keep, and the common ones caſt away; but although they come up at firſt of one *Colour*, if they be *Brimſtone*, *Dove*, *Orange*, *Hair*, *Iſabella*, *Gredeline*, *Shamway*, or any light and ſtrange *Colour*, caſt them not away, for in a Year or two many ſuch have changed into good marked *Flowers*.

NARCISSUS or DAFFODILLS.

THere are divers ſorts of *Daffodills*, as well ſingle as double, ſome with broad, and ſome with narrow green *Leaves*; ſome bearing one, and others many *Flowers* on a *Stalk*. And amongſt the great variety, theſe ſorts following are of chief eſteem amongſt *Florists*.

Narciſſus Non pareil, or the *Incomparable Daffodil*; the *Incomparable Daffodil* with a double Flower or Cup; the great double *French Daffodil*; the leſſer double *French Daffodil*; the double white *Daffodil of Virginia*; the great *Daffodil* of *Africa*; the great *Brimſtone* coloured *Daffodil*; the *French Daffodil* with the *yellow Cup*; the white *Daffodil*, which many *flowers*; the yellow *Daffodil of Ciprus* with many *flowers*; the great *African Daffodil*; the white *Junquilio*, or *Ruſs. Daffodil*, the white turning *Junquilia*, the yellow turning *Junquilia*; the yellow turning *Junquilia*, with a white *Cup*; the white turning *Junquilia* with a yellow *Cup*; the *Junquilia* with a great Cap; the double *Junquilia*; the great Sea *Daffodil*; the *Indian* broad Leaved *Daffodil*; the *Indian* broad Leaved *Autumn Daffodil*; the *Indian Autumn Daffodil*; the broad Leaved *Daffodil* with *Scarlet Flowers*, called *Jacobea*; the broad Leaved *Virginian Daffodil*, with a Purple Flower, the great yellow *Spaniſh Baſtard Daffodil*; *Tuggies* great double *Baſtard Daffodil*; the leſſer double *Baſtard Daffodil*, or *Wilmores* double *Daffodil*; *Parkinſons* double *Daffodil*; the double *Engliſh Baſtard Daffodil*; the white *Baſtard Junquilia*; the Golden double narrow Leaved *Daffodil*; the great yellow Baſtard *Junquilia*.

The greateſt part of theſe *Daffodils* are hardy, great encreaſers, except it be thoſe that bear many Flowers on a Stalk, as alſo the double white of *Virginia*, the double yellow of *Cyprus*, and thoſe of *Conſtantinople*.

Not much unlike unto the *Daffodills* as to nature, are the greater early *Bulbous Violet*, the leſſer early *Bulbous Violet*, and the great late *Flowering Bulbous Violet*.

Theſe as well as the *Daffodils* are early *Flowers*, and do alſo much encreaſe by the Root, and very apt to *off-ſets*, they loſe their *Fibres*, and are taken up out of the Ground, and ordered like unto *Tulips*.

The HYACINTH, or IACINTH.

THe ſorts of moſt eſteem of this *Flower*, are either the great *Indian* tuberous Rooted *Hyacinth*, the great yellow Musk *Grape Flower*, or yellow *Muſcari*, the *Aſhcoloured Muſcari*, the red *Muſcari*, the white *Muſcari*, the fair haired *Jacinth*, the fair curled haired *Jacinth*, the great Starry *Jacinth*

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cinth of *Peru*, the great white Starry *Jacinth* of *Peru*, the great bluſh Starry *Jacinth* of *Peru*, the Sky-coloured *Grape-flower*, the white *Grape-flower*, the bluſh *Grape-flower*, the branched *Grape-flower*, the great Oriental *Jacinth*, the *Celeſtial Hyacinth*, the early white Oriental *Jacinth*, the fair double blew Oriental *Jacinth*, the common blew Starry *Jacinth*, the early Starry *Jacinth*.

All theſe loſe their *Fibres*, and may be removed in *June* and *July*; they are hardy, and require no great Attendance; moſt of them bear *Seeds*, and are ſowed as *Tulip Seeds*.

ORNITHOGULUM.

THe Star of *Bethlehem*, the greateſt white Star of *Bethlehem*, the Star flower of *Arabia*, the Star flower of *Naples*, the yellow Star of *Bethlehem*, the *Star-flower* of *Æthiopia*, the great white ſpiked Star of *Bethlehem*;

Theſe aforeſaid *Flowers* loſe their *Fibres*, and the Roots may be taken up ſo ſoon as the *Stalks* are dry, and may be kept out of the Ground until *September*.

MOLY.

THe great *Moly* of *Homer*, the *Indian Moly*, the *Hungarian Moly*, *Serpents Moly*, the yellow *Moly*, the *Spaniſh* purple *Moly*, the *Spaniſh* Silver Cupped *Moly*, *Dioſcorides* his *Moly*, the ſweet *Moly* of *Montpelier*, and *Homer's Moly*,

Theſe loſe their *Fibres*, and are to be taken up after the *Stalks* are dry; they are hardy, and will thrive in any Soyl.

The ASPHODIL.

THis bears a *Star-like-flower*; the chief ſorts are the great white branched *Aſphodil*, the white unbraced *Aſphodil*, the bluſh coloured *Aſphodil*, the great white ſtriped *Aſphodil*, the little white hollow *Aſphodil*, the ſmall yellow *Aſphodil*, the yellow *Lily Aſphodil*, the *Lily Aſphodil* with a white Flower, and the *Lily Aſphodil* with a bluſh Flower.

The SPIDER-WORT.

OF this Flower, the beſt ſorts are the *Savoy Spider-wort*, the great *Italian white Spider-wort*, the common *unbraced Spider-wort*, and the *Virginian Spider-wort*.

The *Lily Aſphodils* flower about the end of *May*, and the *Spider-worts* about the beginning of *June*. They are both hardy, and will thrive in any Soyl; the beſt time to take them up and tranſplant them is in *Auguſt*.

PEONY.

THis Flower is Male and Female, and of ſeveral ſorts both ſingle and double; the chief are the double Red *Peony*, the double Purple, the double Carnation, the double Bluſh, or White, and the double Strip'd *Peony*.

They generally *flower* in *May*, are very hardy and fit for any Soyl. They are a very ſpreading and ornamental *Flower*, and uſually ſet at the Corners of *Borders*.

The MEADOW SAFFRON.

THe principal ſorts of this Flower are the Party-coloured *Meadow Saffron*, the variegated *Meadow Saffron*, the dark Purple ſtriped *Meadow Saffron*, the Checketed *Meadow Saffron* of *Naples*, the Checkered *Meadow Saffron* of *Chio*, the double *Meadow Saffron*, the double variegated *Meadow Saffron*, and the greateſt double *Meadow Saffron*.

When the Stalks of theſe are dry, take them up, and about the beginning of *September* they may be Set again; they will ſuddenly put forth *Fibres*, and ſoon after will *flower*; they are hardy, and will thrive in any Soyl.

CROCUSES.

THis Flower is of divers ſorts, ſome *flowering* in the *Spring*, and others in *Autumn*, and of this the true *Saffron* is a kind; the other chief ſorts are the great white *Crocus*, the white *Crocus* of *Maſia*, the pale feathered *Crocus*, the *Imperial Crocus*, the *Royal Crocus*, the ſmaller purple *Crocus*, the greater purple *Crocus*, the blew *Neapolitan Crocus*, the purple *feathered Crocus*, the purple ſtriped *Crocus*, the great purple ſtriped *Crocus*, the greater purple *flamed Crocus*, the yellow *Crocus*, the yellow ſtriped *Crocus*, the *Cloth of Gold Crocus*, the Silver-coloured *Autumn Crocus*, the purple *Mountain Crocus*, and the *Autumn Mountain Crocus*.

All theſe ſorts of *Crocuſſes* both of the *Spring* and *Autumn* loſe their *Fibres*, with their Leaves, and may be then taken up and kept dry; thoſe of *Autumn* until *Auguſt*, and thoſe of the *Spring* until *October*; they are hardy, and will thrive in any Soyl.

The IRIS, or FLOWER DE LIS.

THere are great varieties of this Flower, *viz.* the *Perſian Iris*, or *Flower de Lis*, the *Engliſh* blew *bulbous Iris*, the great *bulbous Iris* with a rich blew Flower, the blew ſtriped *Iris*, the great purple variable *bulbous Iris*, the great Aſh-coloured ſtriped *bulbous Iris*, the great variable coloured *bulbous Iris*, the great pale Red, or Peach-coloured *bulbous Iris*, the great white *bulbous Iris*, the great white ſtriped *Iris*, the great white *bulbous Iris* ſtriped with purple, and the great yellow *bulbous Iris*, or *Flower de Lis*.

The leſſer *bulbous Flower de Lis*, or *Iris*, are alſo of ſeveral ſorts, *viz.*

The *Spaniſh* narrow Leaved *Iris*, the narrow Leaved *bulbous Iris* with a ſpotted Stalk.

Other ſorts of *Flower de Lis* in *France*; *viz.* the *Agat Iris*, the *African Iris*, *Aleppo Iris*, *Amboiſ Iris*, *Arabian Iris*, the *Iris* of *Avergne*, *Iris du Blois*, *Iris de Bologne*, *Iris* of *Britany*, *Iris* of *Brie*, *Chamber Iris*, *Iris* of *Candy*, *Iris* of *Caſtile*, *Iris* of *Damaſcus*, *Iris* of *Egypt*, *Iris* of *Florence*, *Iris* of *Florida*, *Iris* of *Frontiers*, *Iris* of *Gaſcogny*, Grand *Signiors Iris*, *Iris* of *Greece*, *Iris* of *Guiney*, *Indian Iris*, *Iris* of *Judea*, *Iris* of the *Lewant*, *Iris* of the *Lombards*, *Iris* of *Lorrain*, *Iris* of *Lybia*, *Iris* of *Macedon*, *Iris* of *Maldives*, *Iris* of *Melinda*, *Iris* of *Mexico*, *Iris* of *Milan*, *Iris* of the *Moluccoes*, *Iris* of *Parma*, *Iris* of *Picardy*, *Iris* of *Poets*, *Iris* of *Poictou*, *Iris* of *Portugal*, *Iris* of *Pay*, *Rochetain Iris*, *Iris Royal*, *Iris* of *Savoy*, *Iris* of *Sicily*, *Iris* of *Siena*, *Swiſs Iris*, *Iris* of *Syria*, *Iris* of *Tartary*, *Iris* of *Turkey*, *Iris* of the *Valleys*, *Iris* of *Valois*, *Iris* of *Vandois*, and the *Venetian Iris*.

The *Seeds* of all theſe are ſowed and ordered as *Tulips*.

Other ſorts of Flower de Lis.

THe Tuberous or Flag-leaved *Flower de Lis*, the great and leſſer *Chalidonian Iris*, the great *Flower de Lis* of *Dalmatia*, the blew *Flower de Lis* of *Aſia*, the twice flowering *Portugal Flower de Lis*, the variable Purple *Iris* of *Camerarius*, the blew Party-coloured *Iris*, the white variable *Flower de Lis*, the yellow *Flower de Lis* of *Tripoli*, the great blew narrow-Leaved *Iris*, the narrow-Leaved variable *Iris* of *Cluſius*, the greater double narrow-Leaved *Iris*, the great white Dwarf *Iris*, and the Bluſh-coloured Dwarf *Flower de Lis*, or *Iris*.

All theſe Flowers are hardy, and will grow in any Soyl.

CORN-FLAG.

THe chief ſorts of this Flower are the *Corn-Flag* of *Conſtantinople*, the *Corn-Flag* with a bright red Flower, and the *Corn-Flag* with bright Flowers.

Theſe Flower about *July*, when their Stalks are dry they loſe their *Fibres*, and may be taken up, and ordered as *Iris*.

The BEE-FLOWER.

THe *Bee-Flower*, *Gnats*, *Satyrion*, *Fly-Orchis*, *Dogs-Tooth Violet*, *Dogs-Tooth* with a white Flower, *Dogs-Tooth* with a pale Purple-flower, *Dogs-Tooth* with a Red-flower, and *Dogs-Tooth* with a Yellow-flower.

The SOW-BREAD.

THeſe are alſo of ſeveral ſorts, *viz.* the purpled *Cyclamen* of the *Spring*, the white *Candy Cyclamen* of the *Spring*, the double white Spring *Cyclamen* of *Antioch*, the pale Purple *Cyclamen* of the *Spring*, the *Summer Cyclamen*, the *Roman Cyclamen*, the *Ivy-leaved Cyclamen*, the Narrow-leaved *Cyclamen*, and the Double-leaved *Cyclamen* of *Antioch*.

The *Roots* of theſe Flowers do not loſe their *Fibres*, and therefore are ſeldom to be removed; but if tranſplanted, it is in *June*, or *July*.

ANEMONIES, or the WILD FLOWER.

THere are great variety of theſe Flowers, but may be reduced under theſe two Heads, *viz.* the *Anemone* with broad Leaves, and the *Anemone* with narrow Leaves; and both ſorts bring forth divers Slips of curious Flowers, *viz.*

The common great double variabic Broad-leaved *Anemone*, the common Broad-leaved ſcarlet *Anemone*, the Broad-leaved *Anemone* with a double ſcarlet flower, the Broad-leaved double ſcarlet variegated *Anemone*, the double Broad-leaved red *Anemone*, the Broad-leaved double purple *Anemone*, the double Broad-leaved purple variegated *Anemone*, the Broad-leaved *Anemonies* with ſingle flowers, the common double Narrow-leaved red *Anemone*, the double Narrow-leaved variable *Anemone*, the double Narrow-leaved ſcarlet *Anemone*, the double ſcarlet variegated Narrow-leaved *Anemone*, the double Narrow-leaved *Anemone* with a *Scarlet Thrum*, the double Narrow-leaved *Anemone*, called *Nacara*; the double Brimſtone coloured Narrow-leaved *Anemone*, the Narrow-leaved double green *Anemone*, the greater white Narrow-leaved double *Anemone*, the Narrow-leaved bluſh *Anemone*, called *Colombina*; the double Narrow-leaved Roſe-coloured *Anemone*, the Narrow-leaved double ſpotted bluſh *Anemone*, the Narrow-leaved double purple *Anemone*, the Narrow-leaved double Lavender-coloured *Anemone*, the Narrow-leaved *Anemone* with the Purple Thrum, the Narrow-leaved double *Anemone* with the dark Purple Thrum, called *Amarant*; the double Narrow-leaved variegated *Amarant Anemone*, the double Narrow-leaved *Anemone* of five Colours, and the Noble double *Anemone*.

Beſides theſe *Anemonies* already mentioned, which have been long in *England*, there are abundance of other new ſorts raiſed of Seeds in *France* and *Flanders*, all bearing five double Flowers differing from each other both in colour and faſhion, the Names of which are taken notice of in Mr. *Rea's* Book of *Flowers*, fol. 123.

Theſe *Anemonies* (both double and ſingle) bring forth their Flowers in *March*, *April*, and *May*, which for the generality are very beautiful; and for the ordering them great care muſt be taken, as to the Soyl of the Ground, the Seaſon, and manner of planting and taking them up, which Mr. *Rea* hath largely treated of.

RANUNCULUS, or CROWFOOT.

THis Flower is of divers ſorts, thoſe of moſt eſteem are the double white *Ranunculus* of *Candia*, the Cloth of Silver *Crowfoot* of *Candia*, the double yellow *Crowfoot* of *Aſia*, and the double red *Crowfoot* of *Aſia*.

There are divers other ſorts of *Ranunculus's*, or *Crowfoot* of *Aſia*, with fine double Flowers; viz. *Bozvel* or *Plumaſſo*, *Pianſeo*, *Sang de Beuf*, the Monſter or Giant *Ranunculus*, the great *Monſter*

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ſter of *Rome*, *Puvoin* of *Rome*, *Marvelia*, *Sphericus*, *Fericus Traſbe*, *Surifix*, *Turks Turvan*, *Marvellen de Paris*.

Ranunculus of *Aſia* with ſingle Flowers are of divers ſorts and colours, which with Direction for the ordering them are ſet down by Mr. *Rea*, Pag. 131.

WOLF-BANE.

THis is alſo of divers kinds, the chief are the Winter *Wolf-Bane*, the pale Winter *Wolf-Bane*, &c.

Theſe bring forth their Flowers with green Leaves in *January*, which is the chief Rarity in them.

HIPATICA, or LIVERWORT.

THis is of two ſorts, the one bearing ſingle, the other double Flowers, which are of moſt eſteem, the chief of which are the double purple *Hipatica*, the double Blew, the double White, and the double Red.

Theſe Flowers about Mid *March* are to be ordered as *Auricula*'s.

HELLEBORUS, or HELLEBOR.

THis is of two ſorts, *viz.* Black and White; the true black *Hellebor*, called the *Chriſtmas-Roſe*, the white *Hellebor*, with a Dark-red Flower, our *Ladies-Slipper*, the ſmall white *Hellebor*, and the ſmall purpliſh *Hellebor*.

GENTIAN.

THe *Gentian* is of ſeveral ſorts, the chief are the Great *Gentian* with a yellow Flower, and the *Gentian* of the Spring.

BELL-FLOWERS.

THeſe are alſo of ſeveral ſorts, and both double and ſingle, the chief are the *Peach*-Leaved *Bell flower*, the Steeple *Bell-flower*, the great *Canterbury Bell*, the double *Canterbury Bell*, Giants *Throat-Wort*, and the *Cardinals Flower*.

All theſe Flowers are eaſily encreaſed, and thrive very well in moſt Soyls, provided they ſtand not too hot in the *Sun*; but the *Cardinals Flower* is more tender, and requires good care.

JUCCA INDICA, with other Indian Plants.

THe *Indian Jucca*, the *Virginian Silk*, the *Indian flowering Reed*, and the *Indian Fig*.

AURICULA's.

THis Flower is of ſeveral ſorts and colours, as *Purple*, *Red* or *Scarlet*, *Tellow* or *Buff*, and *White*: Moſt bear the Names of thoſe that raiſed them, which are taken notice of by Mr. *Rea*, fol. 142. together with Directions for the raiſing and ordering them.

PRIMROSES, and COWSLIPS.

THeſe Flowers are of divers other ſorts than thoſe common to us in *England*. Mr. *Rea* takes notice of theſe ſorts, *viz.* the common double *Garden Primroſe*, the *Couſlip Hoſe in Hoſe*, the double green *Couſlip*, the double green *Primroſe*, the *Jack-an-Apes* on *Horſeback*, the *Couſlip* with a *Jagged Hoſe*, the Red *Primroſe*, the double Red *Primroſe*, the Red *Couſlip*, or *Oxlip*, the Orange coloured *Couſlip*, and the Red *Couſlip* in *Hoſe*.

CHAMPIONS.

THeſe are likewiſe of ſeveral ſorts, *viz.* the double Red *Roſe Champion*, the double White *Roſe Champion*, the ſingle *Nonſuch*, the *Flower* of *Briſtol*, and the rich Scarlet *Nonſuch*.

WALL-FLOWERS.

THe principal ſorts of this Flower are the great ſingle *Wall-flower*, the double *Wall-flower*, the ſingle White, and the double White; the double Red, and the pale Yellow *Wall-flower*.

STOCK-GILLIFLOWERS.

THis Plant is of ſeveral ſorts and Colours, and both ſingle and double, *viz.* the double ſtriped *Stock-Julliflower*, the yellow *Stock*, the bluſh *Stock*, and the whiter *Stock-Julliflower*.

They are raiſed from *Seed*, and *Slips*; if from *Slips*, make choiſe of ſuch Branches that bear no *Flowers*, which cut off ſome diſtance from the *Stock*; then ſlit down the *Bark* at the End of the *Slip*, about half and *Inch* in three or four places, which peel as far as it is ſlit, and turn up; then cut off the naked Woody part cloſe to the Rind that is turned up; then make a pretty wide Hole in the Earth to ſet it in about three *Fingers* deep with the Bark ſpread open round about the end thereof; which done, cover it with good Earth, keep it in the ſhade, and water it for ſome time, to cauſe it to draw Root.

Plants that bear double White-flowers.

DOuble *Pellitory*, double *Feather-few*, double *Camomil*, double *Dog-fennel*, double *Lady-Smocks*, and double *Daffies*.

GILLI-FLOWERS.

THis Flower for its beautifulneſs and fragrant ſmell may deſervedly have the preheminence of all others. There are an innumerable many ſorts both double and ſingle, amongſt which theſe following are taken notice of by Mr. *Rea*, which had their original from *Holland*, *Flanders*, and the *Netherlands*; viz. *Achilles*, *Acteon*, Admiral of *England*, *Admiral Towne*, *Admiral Rowſe*, *Admiral Lifgins*, Admiral of *Spain*, Admiral of *Arragon*, *Admis*, *Agot*, *Bertine*,

Bertine, *Ajax*, *Abertine*, *Alcetus*, *Abiance*, *Imperial*, *Alexander* the Great, *Alexander* of *Holland*, *Albertine*, *Amazone*, *Andronicus*, *Angelion*, *Approaching Sun*, *Apollo*, *Apelles*, *Argus*, *Aſtrea*, *Aetalanta*, *Auguſtus Cæſar*, *Auguſtina*, *Aurora*, *Aure-ſtella*; *Barnadine*, *Barkſhire*, *Beauty* of *England*, *Baron* of *France*, *Bel Triumphant*, *Bell-Montwas*, *Belvidere*, *Bel Curtiſan*, *Bel Angloiſe*, *Bel Believer*, *Bel* in *Tounton*, *Bel Infanta*, *Bel Franſwav*, *Bel Roſe*, *Bel Gentoice*, *Bel Magdalen*, *Bel Holandres*, *Bel Antus*, *Bel Brunetta*, *Bel Blome*, *Bel Joy*, *Bel Roſaline*, *Bellarmine*, *Beloved*, *Bethlem*, *Beu Buiſſon*, *Beu de Lile*, *Beu de Dennis*, *Beu Deeper*, *Belle Olinda*, *Beu Monelle*, *Beu de Corn*, *Beu de Harlem*, *Beerſheba*, *Boor Van Lakerbe ck*, *Bele de Lanoy*, *Belle Princeſs*, *Belle de Bruxels*, *Blazing Star*, *Black Imperial*, *Blanch de Bruxels*, *Blew Chriſtal*, *Bohemia Crown*, *Bonaventura*, *Bonum Magnum*, *Brown purple*, *Brabaſon*, *Brewers Paragon*, *Brown Favorite*, *Brown Apelles*, *Bride of Holland*, *Brun de Brune*, *Burſtol*, *Cardinal*, *Carthuſa*, *Charles* the Great, *Charles* the Fifth, *Charles* the Firſt, *Charles* the Second, *Chriſtal*, *Chancellor*, *Cleopatra*, *Coluſa*, *Count Mansfield*, *Count Lodowick*, *Count Florus*, *Count* of *China*, *Count Henrick*, *Counteſs* of *Flanders*, *Covenant* of *England*, *Court* of *Caſtile*, *Coridon*, *Crown* of *England*, *Curſella*, *Cupidon Royal*, *Cydonia*, *Darius*, *Daris*, *Diana*, *Don Alphonſo*, *Don Doria*, *Don John*, *Dolphin*, *Dore*, *Dorothy* of *Holland*, *Dorilliſant*, Duke of *Anjou*, Duke of *Bucks*, Duke of *Burgundy*, Duke of *Brunſwick*, Duke of *Cambridge*, Duke of *Freeſland*, Duke of *Florence*, Duke of *Lorrain*, Duke *Phillip*, Duke *Victor*, Dutch *Royal Dunkirk*, Dutcheſs of *Brabant*, Dutcheſs of *Cleaveland*, Dutcheſs of *Monmouth*, Dutcheſs of *York*. *Engle Royal*, *Englet*, *Emperour Conſtantius*, *Dalfaſt*, Empire of *Ruſſia*, *Emperour*, *Emperors Court*, *Emperour Radolphus*, *Emperatoria*, *Emillai*, *Fair* Dutcheſs, *Fair Flora*, *Fair Frances*, *Fair Hanna*, *Fair Hellena*, *Fair ſhepherdeſſe*, *Favorite*, *Fieldſby*, *Florida Floradine*, *french Marble*, *Galatea*, General of *Auſtria*, General *de Dorne*, General *Gouda*, General of *Holland*, General of the *Indies*, General *Lambert*, General *Monk*, General *Palmer*, General *de Pike*, General *Rowſe*, General *Tueſt*, General *Wigons*, *German Empire*, *Giants Head*, *Gizantik*, *Gliſtering Star*, *Golden Crown*, *Golden Piece*, *Grand* Duke *Royal*, *Gravie Earneſt*, *Gray Floriſt*, *Gray Hulo*, *Grand Britain*, *Grand Conſtantine*, *Grand Cæſar*, *Grave Florus*, *Grave William*, *Grave Vandike*, Great *Boor*, Great *Captain*, Great *James*, Great *Monarch*, Great *Prophet*, Great *Seneca*, Great *Tamberlain*, Great *Turk*, *Grotius*, *Halſton*, *Hariſon*, *Heart* of *Oak*, *Hecuba*, *Houſe* of *Peers*, *Houſe* of *Commons*, *Hoſt* of *Bohemia*, *Honora*, *Hugonot*, *Imperial* of *Holland*, *Incarnadine-Corinthi*, *Incarnadine de Bezond*, *Incarnadine de Blan*, *Joyeſſe*, *Iſſabella la bella*, *Jupiter*, *Juno*, *Kereme*, *Kill-all*, King of *Aſſyria*, King of *Bohemia*, King *David*, King of *England*, King of *Aethiopia*, King of *France*, King of *Naples*; King of *Poland*, King of *Portugal*, King *Rebobham*, King of the *Romans*, King *Solomon*, King of *Spain*, *Kings Court*, *La Croy*, *La Moriſco*, *Land* of *Promiſe*, *Lackerbet*, *La Joyeſſe*, *La Perle de Dennis*, *La Placidia*, *La Super Bona*, *Laſt Hope*, *Latiſſon Dore*, *Leviam*, *Leont de Scemes*, *Leo*, *Linne Frecal*, Lord of the *Camp*, *Loofte*, *Lorea*, *Loyalty*, Lord of *Gaunt*, Lord *Frances*, Lord *Pleaſure-Boat*, Low *Haule*, *Luſty-gallant*, *Maſter de Camp*, *Mimada*, *Marvel de Mundi*, *Martin Grim*, *Marble-ſtone*, *Marble-Roſe*, *Mearmaid*, *Minerva*, *Mirabilia*, *Moriſſion-Nonparel*, *Monſtrum* of *England*, *Monſtrum* of *Holland*, *Morillion-Triumphant*, *Morning-ſtar*, New St. *George*, New *Bonaventura*, New *Hogonet*, New *Appollo*, New *Boore*, New *Cook*, *Covenant*, *Neſarial*, *Nimph Royal*, *Non-parelia*, *Non-ſuch*, *Olimpia*, old *Veſtal*, *Omega*, *Oriental*, *Ovid*, *Oxenar Oyleman*, *Paſs Monarch*, *Paſs Imperial*, *Paſs Tout*, *Painted-Lady*, *Pantelece*, New *Paragon Aleta*, *Paragon Rike*, *Philomel*, *Phillis*, *Piramid*, *Picotomine*, *Polidore*, Prince of *Tire*, Prince *Henry*, Prince *Rupert*, Prince *Thomas*, Prince of *Wales*, Prince of *Orange*, *Princes Court*, Princeſs of *Savoy*, Purple *Paragon*, Purple *Imperial*, Purple *Royal*, Queen *Elizabeth*, Queen *Katherine*, Queen of *France*, Queen of *Sweden*, Queen of *Portugal*, Queen of *Perſia*, Queen *Heſter*, Queen *Hellena*, Queen *Cleopatra* Queen, *Biddia*, *Raviſant*, *Regent*, *Reutineere*, *Remus*, *Romulus*, *Roſilliante*, *Roſamond*, *Roſe* of *Jerico*, *Royal Match*, *Royal Oak*, *Royal Jeremy*, *Royal Exchange*, *Roxalana*, St. *John*, St. *Joſeph*, St. *Michael*, St. *George*, *Salamander*, *Saliſbury*, *Soliman*, *Sommer Fair*, *State Houſe* of *Amſterdam*, *Super Bonerges*, *Suſanna*, *Super Eminent*, *Tapiſere*, *Thodefier*, the *Jewel*, the *Cook*, *Thomulin*, *Tiberius Cæſar*, *Triumphans*, *Tribune*, *Triumph* of *Sapin*, *Tricolor*, *Troupes*, *Validdi*, *Van Velſon*, *Vetonica*, *Veſtina*, *Virgin* of *England*, *Virgin* of *Middleſex*, *Virgin* of *Orleance*, *Virgin* of *Lile*, *Virgin* of *Cullen*, *Vice Admiral*, *Vice Roy*, *Victoria*, *Ulyſſes*, *Unick de Lovel*, *Virick Duny*, *Uterpendragon*, *Warwick Hero*, white *Diana*, white *Nobleſs*, white *Hugonet*, white *Lady*, *Witties* Rich Scarlet.

By this *Catalogue* the great Variety of *Dutch Julyflowers* doth appear, which by them are Yearly raiſed from *Seeds*, but it will not be ſo with us in *England*, as Mr. *Rea* noteth, for they will ſoon degenerate, and become ſingle, nor will they be ſo large, thick and double, neither of ſuch well intermixed, ſtriped, and flaked Colours; And all the beſt *Dutch Flowers* may be comprehended under theſe three Heads, *viz.* *Red* and *White*, *Purple* and *White*, and *Scarlet* and *White*.

And amongſt the great Variety of *Flowers*, theſe following are now in moſt eſteem.

Red and White JULYFLOWERS.

Achilles, *Ajax*, *Alcetus*, *Approaching Sun*, *Argus*, *Barkſhire*, *Bel Infanto*, *Bel Joy*, *Bel-Franſway*, *Bella de Bruxels*, *Bella Brunetta*, *Bohemia*, *Crown*, *Coridon*, *Count of Lodowick*, *Cydonia*, Duke of *Lorrain*, Duke of *Bucks*, Duke of *Anjou*, Duke of *Florence*, General of *Holland*, Great *Turk*, Grand Duke *Royal*; King *Charles* the *Second*, *La Super Bona*, *Low Haule*, *Marble Stone*, *Monſtrum* of *England*, *Monſtrum* of *Holland*, *Polidore*, Prince *Henrick*, Queen *Katherine*, Queen *Hellena*, *Super Eminent*, Virgin of *England*, Virgin of *Cullen*, Virgin of *Middleſex*.

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Purple and White JULYFLOWERS.

ADmiral of *Spain*, *Aliance Imperial*, *Andronicus Beloved*, *Brown Purple*, *Cleopatra*, Court of *China*, Crown of *England*, *Darius*, *Dolphin*, Duke of *Burgundy*, Fair *Helena*, General *Wigons*, *Grave William*, Great *James*, King of *Spain*, King of *Affiria*, King of *Naples*, *La Platcidia*, New *Appollo*, New *Hugomot*, New *St George*, *Oylman*, *Pass tout*, Prince of *Tyre*, *Purple Imperial*, Purple *Paragon*, Queen of *France*, Queen *Elizabeth*, Queen of *Portugal*, Queen *Biddia*, *Salisbury*, *Tapiffere*, *Ulysses*, *Warwicks Hero*.

Scarlet and White JULYFLOWERS.

Albertine, *Attalanta*, *Aurora*, Baron of *France*, *Bel Gentoice*, *Beauty* of *England*, *Blazing Star*, *Brewers-Paragon*, *Pride* of *Holland*, *Don Doria*, Duke of *Cambridge*, Dutchess of *Cleaveland*, Dutchess of *Brabant*, Emperor *Conftantius*, Fair *Flora*, *Golden Crown*, *Golden Fiece*, *Isabella*, *Lubella*, *Juno*, King of *France*, King of *Poland*, Land of *Promise*, Lord of *Gaunt*, *Mirabilis*, New *Cook*, New *Paragon*, *Aletta*, *Paragon Rike*, *Remus*, *Romulus*, *Rosamond*, *Royal Exchange*, *Somerfair*, *Tiberius Cæsar*.

These *Julyflowers* are in their pride and glory in *July*, and so continue till the middle of *August*.

For the Raising and Ordering these choise *Flowers*, take these following Directions. Before to make choise of a good *Soil*, neither too stiff, nor too light; and withal that it is very rich by mixing good store of old rotten *Dung* amongst the *Earth*. This *Earth* put into your *Pots* designed for your *Flowers*, and therein set the *Layers*, either as you take them off in *September*, or else in *March* being the Spring time; but before you Plant them, cut away with a pair of *Scissers* from the *Layers* all the Dead *Leaves*, and the Tops that are too long: and when you take them up to set into the *Pots*, let the *Earth* be about the *Roots*, and give them convenient Watering, but not too much whereby to rot the *Roots*. Let the *Pots* be so placed to have the Morning *Sun* only, for that of the Afternoon doth more hurt than good; until mid *April* water in the Morning, and after when the *Sun* grows hot, in the Evening; and the *Pots* with *Flowers* so soon as the *Sun* is gone off them.

The Fat and Richness of the *Earth* in *Pots*, is sooner wasted than in *Beds*, so that every Year there should be a new supply of fresh and good, by taking away as much of the old *Earth*, as you can without hurting the *Roots*, and putting in more in the room; and also take away these *Roots* that are killed by the Cold.

When the *Flowers* begin to Spindle, nip off such that are smallest, leaving one or two of the biggest at each *Root* to bear *Flowers*, by which means the *Flowers* will be fairer.

From mid *June* to mid *July* is the best Season for laying *Julyflowers*, and if well watered, they will take *Root* in about six or eight Weeks, and be fit to remove if occasion requires; but the best Season to remove them is in *March*.

When the *Flowers* are Spinled, tye them to Sticks, and let all the Superfluous Buds be nipt off to make the *Flower* the fairer. When the *Flowers* begin to appear, open the Tops of the *Pods* a little, to give the *Flower* liberty to come forth. Those *Pods* that break through the largness of the *Flower*, may be neatly bound about with a *Thread*, or *Wyre*.

Your great care to preserve these tender Plants is in Winter, from *Rains*, *Snows*, pinching *Frosts*, and cold North and East *Winds*; therefore be provided with a Winter House, to set them in, as before advised; and in *February* and *March* when the Days are Fair and Warm, set them abroad a little to Ayr; and now and then a gentle shower of *Rain* to fall upon them, would much refresh them; but be sure to take them in at *Nights*; and in *April* you may set them abroad where they are to stand, filling up the *Pots* that want *Earth*, and cutting away the dead Leaves.

But those that have not the conveniency of a House, may place the *Pots* close to a South, or West *Wall*, where with *Boards* made *Penthouse*-wise, they may be defended from the aforesaid injuries of the *winter Weather*, which *Boards* may be to take off at Pleasure to Air them; And this way by some *Florists* is esteemed better than to put them in *Houses*.

Julyflowers or *Cornations* are also raised by *Seed*, for which observe these Directions; about *October* cut off the *Stems* with the *Cods* of those *Flowers* you design for *Seed*, which hang up in some dry upper Room until Spring, then rub out the *Seed*, and Sow it, which will bear in the Flower Season.

CLOVE JULYFLOWERS.

THe *Clove* is a more hardy *Flower*, and will endure to grow in *Beds* well enough, but in the Snowy Frosty Weather shake off the Snow from them, and lay about the *Roots* some mouldy Straw, which is a great preservative of them. They are encreased by *Layers*, as other *Julyflowers*; but not by *Seed*.

PINKS.

THis *Flower* is of several sorts, and both single and double, the latter being the best; and of those the double *Feathered Pink of Austria* is of most esteem, being of different colours, but generally *White* and *Reds*. They are encreased by *Slipings*, and are most used to set on the edge of *Borders*, for which use is also the *Matted Pink*.

SWEET JOHNS, and *SWEET WILLIAMS.*

THese are of several sorts, and all bear many *Flowers* on one Head or Stalk; and of variety of Colours; but generally white and red, with a mixture of both. They *Flower* in *June* before *Pinks*; they are raised by *Seeds*, and the Slipings also will grow.

The

The double *Sweet Johns*, and the *Velvet Williams* are pretty *Flowers*.

Colombines.

THese are of many sorts, differing in Form as well as shape, being raised from *Seeds*; the double are of most esteem, and are generally *White*, *Blew*, *Murrey*, *Red* or *Purple*, or a mixture of some of these. Those of most repute are the double inverted *Colombines*, the double *Rose*, the *Degenerate*, and the *Virginia Colombine*.

They *Flower* about the end of *May*, when *Tulips* go out. The *Seeds* are Sown in *Beds* in *April*, and from thence Transplanted, so that it will be the next Year ere they bear *Flowers*, nor will they continue double well above three years without Degenerating, or turning single.

SNAP-DRAGON.

THis is a common *Flower*, and chiefly differs in its colours; the best sorts are the white, the white Variegated, the red and the yellow *Snap-Dragon*.

THey are raised from *Seeds*, and bear *Flowers* the second Year after Sowing; also the Slips taken off and ordered as the double *Stock-Julyflowers*, will grow and bear *Flowers*.

FOX GLOVES.

THis *Flower* is of several sorts, as to the size and colour, the chief are the *Dun coloured*, the Orange Tawny, the great white, and the great *Yellow Fox Glove*. All which are raised by *Seeds*, and bear *Flowers* the second Year.

Corn Flowers and Blew-Bottles.

This is a common Flower, and grows in Fields.

FLOWER GENTLE.

THis is of two sorts, the greater and the lesser, and of each many Diversities and Colours. They Flower in *August*, and are raised by *Seeds* as others are.

SCABIONS.

THis *Flower* is of several sorts and *Colours*, the chief are the white Flower *Scabion*, the red *Scabion* of *Austria*, and the red *Indian Scabion*. They are raised by *Seeds*, and ordered as other such like *Flowers*.

LARKS HEELS.

THis is as well double as single, being also of several sorts, and raised from *Seeds* usually sown in *April*, the chief sorts are the double upright *Larks Heel*, and the *Indian Cresses*, or yellow *Larks Heel*.

DOUBLE POPIES.

THis is a very common *Flower*, and almost in every *Country Garden*; it bears *Flowers* that are Red, Purple, Scarlet, Leadcolour, Blush or White, and one sort that is very small, with the *Flowers* very double, they Flower in *June*.

MARIGOLDS.

THis is a *Flower* of a great Encrease, and when once Sowed in a Ground, will preserve it self being hardy to endure the cold *Frosts*, the *Seed* lying in the Ground all the Winter. There are several sorts, the chief of which are the *Corn Marigold* of *Peru*, called the *Flower* of the *Sun*, the double Garden *Marygold*, the *African* or *French Marygold*, and the less double *French* or *African Marygold*.

BLEW BINDWEED, or the *BELL-FLOWERS.*

IT is so called by reason of the *Flowers* coming forth from the long *Stalks*, and for shape (when blown) resemble *Bells*, one sort being called *Canterbury Bells*.

Not much unlike these in the manner of growing is the *Mervil of Peru*, but the *Flowers* of different *Colours*; they are raised from *Seeds* Sown the beginning of *April*, in Hot *Beds*, and from thence Transplanted.

APLES of LOVE.

THese are received more for the beauty of the *Aples*, or *Berries*, than for their *Flowers* which are of a *Yellow Colour*.

GARDEN LUPINS.

THese are of four sorts, one with yellow *Flowers*, another with white, and two with blew; they bear *Peafe* like *Blossoms* of a blew Colour; and are Sown in *April*.

Not much unlike these are the *Scarlet Kidney Beans*, which of late Years are very common in *Gardens*.

Thus having given you a Summary of the *Flowers* mentioned by Mr. *Rea*, with some short account thereof; In the next place, I shall observe the same Method in giving an abstract of *Greens*; referring the most curious *Florists* to the Book it self.

CHAP. VII.

Of Greens, to wit, Ever-Green Trees, that bear Flowers, Fruits, or Berries.

THe *BAY-TREE* is of several sorts, *viz.* the Common *Bay-Tree*, known to all; the

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the *Bay-Cherry*, growing about ten or twelve *foot* high, as it were with a thick Buſh full of Boughs, adorned with bright ſhining green Leaves with whitiſh *flowers*, which are ſucceeded by ſmall *Cherries*, black when ripe.

The *Wild-Bay* is moſt proper to ſpread againſt a *Pale*, or *Wall*; It beareth dark green *Leaves*, with great Tufts of ſmall white *flowers* with *Bluſh-edges* on the Tops of the *Branches*, and hath alſo ſmall *blew Berries* that ſucceed the *flowers*.

The *Roſe Bay-Tree* is of two ſorts, the one bearing red *flowers*, and the other white, and both with ſmall Stems.

The *Indian-Bay* ſeldom grows above four *foot* high, and hath a thick Buſh well Leaved, with *flowers* of a greeniſh white, ſucceeded by *Berries* like ſmall *Olives*: 'Tis a fine *Plant*, and by careful keeping in the Winter may be preſerved; it is encreaſed (as moſt others are) by *Layers*, every Slip having the great Leaves ſtript off, and ſet in *March* will grow.

The *Wild-Bay* of *Portugal* is much different from the former *Wild-Bay*, the *Leaves* being browner, and the *Flowers* inclining to purple, but the *Berries* are not unlike them.

The *Cherry-Bay* flowereth in *May*, the *Wild-Bay* in Winter; but moſt beautiful in *March* and *April*; the *Roſe-Bay*, and *Indian-Bay* in *July*.

The *ORANGE-TREE* is a very tender Plant in our *Climate*, and muſt be ſet in *Caſes*, ſo that they may be Houſed in the Winter, as other *Greens* muſt be; and by careful tendance it is of great Beauty, there being at one time *flowers* and *fruit* both green and ripe; but with us it is in its greateſt Beauty in the Spring. Young *Plants* may be raiſed from the *Kernels*, ſet in rich Mould in *Caſes* in *March*, and tenderly kept; they may alſo be graſted in the *Bud*.

The *STRAWBERRY-TREE* is a ſlow grower, ſeldom exceeding five *foot* in height: the Leaves are *Green*, like the *Bays*, and on the End of the Branches grow the *flowers* with long *Stalks*, being little white *Bottles* like thoſe of the *Lily* of the *Valley*, which are ſucceeded by red *Berries*, which are ripe in *October* and *November*; this *Tree* being then in its greateſt Beauty.

This is a choice *Plant* to raiſe either from *Seed*, or *Layers*; but being paſt their tender young Age, are hardy, and will grow very well under any warm *Wall*.

The *MYRTLE-TREE* is a very tender Plant, but by careful Houſing may be preſerved in our cold Climate. There are ſeveral ſorts; The *Broad-leaved Myrtle* groweth in a thick *Buſh* about four or five *foot* high, full of Branches, with ſweet and fine bright ſhining *Leaves*, with *Flowers* at the Joynts of the *Branches*.

The *Leſſer-leaved Myrtle* groweth like the former, but not ſo high.

The *Box-leaved Myrtle* differeth only but in the *Leaves*, which are like to thoſe of *Box*.

The *Double-flowered Myrtle* differeth not from the *Broad-leaved Myrtle*, only it is not ſo large and tall; and the *Flowers* are white, very thick, and double, and of a delicate ſweet Scent.

The Great *Spaniſh Laurel-leaved Myrtle* is larger than any of the former; the *Leaves* are of a whitiſh Green, and for *flowers* and *fruit* little differing from thoſe of the *Broad-leaved Myrtle*.

The *ſweet Indian yellow JESSAMIN* is not above two *foot* high, adorned with fair, ſhining Dark-green *Leaves*, with fair yellow *Flowers* of a ſweet Scent, like unto the white *Jeſſamin*.

The *Variegated*, or *Striped PHILLIREA* is a curious Plant, far exceeding the ordinary ones, uſed for *Ever-green Hedges*: It will grow to the height of a Man, and thick with ſmall *Branches*, and *Leaves*, edged or ſtriped with white.

Theſe and the like *Greens* muſt be ſet in *Caſes*, or *Boxes*, and carefully Houſed in your Conſervatory at the approach of the cold Winter; but at firſt ſet them in only in the Nights, and about *March*, when the *Froſts* are paſt, open the Doors, to give them *Sun* and *Air* to refreſh them; and about the end of *April* ſet them out, waſhing them clean from the *Duſt* and *Cob-Webs*, which they did contract in the Houſe. In the hot Seaſon cover the *Earth* with *Moſs*, to keep it moiſt, watering them as occaſion requires; and whilſt they are in the Houſe forget not to Water them gently, eſpecially in *November*, and after long *Froſts*; but let not the Water touch the Leaves.

Alſo every *Spring* and *Autumn*, that is, before the ſetting the Plants forth and Houſing them, you take ſome Earth out of the *Caſes*, opening the reſt with a *Fork*, or *Tool*, not hurting the tender *Roots*, ſupplying the place thereof with good rich Mould, that is one part *Earth*, and two parts rotten *Dung*.

The *Layers* of the hardieſt *Greens* are to be tranſplanted about Mid *March*, and the more tender about the end of *April*: Let the *Earth* be very rich and fine ſifted before it is put into the Caſes for the ſetting the *Layers*; and at the bottom of the Caſes put ſome ſmall *Stones*, pieces of *Brick*, or the like, to draw away the Moiſture from the *Earth*, which will elſe prejudice the *Roots*; and ſet not the *Plants* too deep in the Earth: When they are ſet, water them, and keep them ſheltred from the *Sun* and *Wind* until they have taken *Root*, which will be about a Fortnight, and after that they may ſtand in the *Air* and *Weather*.

CHAP.

CHAP. VIII.

Of Flower-Bearing Trees, and Shrubs, that fall their Leaves in Winter, and renew them again in the Spring.

THE *Double-Flowered CHERRY* is in all parts like the common *Engliſh Cherry-Tree*, only in the *Flowers*, which in this are large, thick and double; of a fine white Colour, many growing together, which fall off without bearing Fruit.

There is another *Double-Bloſſom'd Cherry*, called in *France Merifziere*, of the common *Black-Cherry*, that beareth a large double *flower*, as big as the leſſer Double white *Roſe*.

The *Double-flowered PEACH-TREE* is not much unlike the common *Peach-Tree*, only its *Flowers*, which are double, conſiſting of three or more rows of Leaves of a rediſh *Bluſh-colour*.

The *Double-Bloſſom'd Wild POMGRANATE-TREE* groweth, if pruned up, about ſeven *foot* high; otherwiſe is a thick *Buſh* full of ſmall *Branches* with ſome Thorns thereon, and many ſhining green *Leaves*, and at the ſides and ends of the *Branches* come forth divers hard, hollow and reddiſh Cups, and out of them beautiful *Flowers* of a bright Crimſon colour as big as *Province Roſes*.

The *Double White PIPE-TREE*, or *JASMINE* of *Arabia*, is a rare but tender *Shrub*, having divers long, ſlender, yet ſtiff Branches, whereon grow fair long *Leaves* of a freſh green colour, two ſtanding at one Joynt one againſt another, and at the ends of the *Branches* ſhoot forth divers *Flowers*, each in an *Huſe*, like thoſe of the common white *Jaſmine*, and of an excellent *ſcent*.

The *PERSIAN JASMINE* comes up with many ſmall Woody Branches, bedeck'd with fine ſmall *Leaves*, and purpliſh blew *Flowers*, of a ſweet *ſcent*.

The *Tree* of *PARADICE* of a dark yellowiſh Colour, ſet with long whitiſh green *Leaves*, bearing along the Branches divers ſmall *Flowers* of a greeniſh yellow.

The *Tree* of *NIGHT-SHADE* is about a Yard high, with a Woody *Stem*, with many green *Branches*, beſet with ſmall long Leaves, and at the Joynts thereof it putteth forth two or three *Flowers* together of a *Star*-like form, and upon the decay of the Flowers come ſmall green *Berries*, that in *December* are red.

The *Shrub SPIRÆA* riſeth up with divers Woody-ſtalks about a Yard high, and at the Tops of the Stalks come forth divers pale Peach-coloured *Flowers* thick ſet together. It flowereth in *Auguſt*, endures the Winter, and is encreaſed by *Layers*.

WOODY St. JOHN's-WORT groweth about a Yard high, is beſet at certain diſtances with Tufts of ſmall green *Leaves*, and amongſt them many ſmall white *Flowers* with purple in the midſt. It flowereth in and about the end of *April*, is hardy, and is encreaſed by *Layers*.

The *MIZERION*, or *Dwarf-Bay*, groweth in a thick Buſh full of *Branches*, with *Leaves* and ſmall *Flowers* growing thick together; ſome of a pale *bluſh Colour*, others of a white, and others of a red; and when theſe fall off, ſmall *Berries* come forth, which when ripe are red. Theſe *Bloſſoms* begin about the end of *January*, and continue till the end of *March*. It is an hardy Plant, is raiſed by ſowing the *Berries*, which lye long in the Ground, not coming up till the next Spring, and the Year following may be tranſplanted.

ROSE-TREES.

THere are divers excellent ſorts of *ROSES*, which former Ages were Strangers unto. An Account thereof is as followeth:

The *Engliſh Red Roſe*, common to all; the *Roſe* of the *World*, of a pale Bluſh with red Spots; the *Hungarian Roſe*, which is of a paler red than the common *Roſe*, and hath many faint Spots in the Leaves; the *Red Province Roſe*, which hath its *Flowers* large, thick, and double, with no great Scent; the *Red Belgick Roſe*, of a fine deep Red, with the *Flowers* very thick and double; the *Dwarf Red Roſe*, called by ſome the *July-Flower Roſe*, which grows low, with the *Flowers* thick but ſmall, and is of a pleaſant *Carnation Colour*, and well ſcented; the double *Velvet Roſe*, which hath two or three rows of *Leaves* of a dark Velvet-red Colour; the *Marble Roſe*, much of the nature of the *Velvet Roſe*, as to its growing; but different in *Flower*, which is larger, more double, and of a lighter Red; the *Roſe* without *Thorns*, or the *Virgin Roſe*, much like the *Marble Roſe*, only without *Thorns*, and the *Flowers* are not ſo thick and double, and of a pale Colour; the *Frankford Roſe*, which hath large thick whitiſh green *Leaves*, with the *Flowers* very thick and double, which are of a bleswiſh red, and very ſtrong Scented; the *Cinamon Roſe* which is very early, coming in *May*; it is but ſmall, and of a pale red; the *Damask Roſe* well known to all, none being ſo common nor of ſo much uſe, eſpecially for making *Roſe-Water*; the party *Coloured Damask Roſe* commonly called *York* and *Lancaſter*, differeth in that the *Flowers* are parted and marked with a pale bluſh, inclining to a white upon the Damask Colour; the *Chriſtal Roſe* little differeth from the *York* and *Lancaſter* only 'tis better marked; the *Damask province Roſe* is very large, thick and double, and of a deeper bluſh; the *Monthly Roſe*, much like the *Damask Roſe*; but not ſo ſweet, it commonly bears three times a year, *viz.* in *June*, about mid *Auguſt*, and about the end of *September*; the *Bluſh Belgick Roſe*, or the white *Province* as being of a pale bluſh. Thus much for *Red Roſes*.

The *Single Yellow Roſe*, by ſome Floriſts eſteem-

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ed but a wild *Roſe*; The *Scarlet Roſe* of *Auſtria* groweth much like the former, with ſingle *Flowers*, which within are *Scarlet*, and without ſide of a pale Brimſtone Colour. The *double yellow Roſe* hath its *Flowers* of a pale yellow, and grows ſomething like the *Damask Province Roſe*.

The common white *Roſe* is of two ſorts, the one double, the other ſingle, and both well known.

The *Bluſh-Roſe* differs nothing from the White but in Colour, which is a very pale *Bluſh*.

The double *Muſk-Roſe* hath its *Flowers*, that come forth on long foot *Stalks* at the End of the Branches many together in a Tuft, not very double, and of a whitiſh Colour and ſtrong Scented; They *Flower* in *Auguſt*.

The *Ever-green-Roſe*, ſo called by reaſon the *Leaves* fall not off in the Winter, but ſtay on until thruſted off at the Spring by the new.

The *Great Apple-Roſe* hath a great *Stock*, and many Branches, with the *Flowers* ſmall and ſingle, ſtanding on prickly Bottoms, which after the *Flowers* are fallen, grow great, red, and of the faſhion of a *Pear*.

Mr. *Rea* ſaith, that *Roſes* are increaſed by laying of *Layers*, that is, the Branches put in the *Earth* with good rotten *Dung* about them to grow the faſter; or by *Inoculating* the *Buds* of them in other *Stocks*; and the beſt *Stocks* are thoſe of the *Damask*, the white and the *Franckford*; and about *Midſummer*, or when good *Buds* can be got. The *Stocks* of *Budded Roſes* muſt be carefully kept from *Suckers*. But the beſt *Stocks* for the *Muſk* and *Yellow-Roſe*, and all thoſe double and *Centiple-Roſes* are the *ſweet Brier*.

When the *Roſes* have done bearing, the Tops ſhould be cut with your *Garden-Shears* ſomething neer, and three or four days after the change of the *Moon*, and then they will bear again about *Michaelmaſs*; and towards the Spring each *Branch* ſhould be cut again with a *Pruning-Knife* cloſe to the *Leaf-Bud*, and what is dead or ſuperfluous ſhould be taken away.

JASMINES, HONISUCKLES, and ſome other woody Flower-bearing Trees.

Aſmines are of ſeveral ſorts, the white *Jaſmine* ſufficiently well known and much eſteemed for its pleaſant *Scent*; The *Catalonian* or *Spaniſh Jaſmine*, hath its *flowers* much larger than the former, and ſweeter, with Bluſh-coloured Edges: The double *Spaniſh Jaſmine* much like the firſt, but the *Flowers* double; The *Yellow Jaſmine* is a great encreaſer, bearing ſmall long hollow *Flowers*. The *Indian Scarlet-Jaſmine* hath its *Flowers*, that come forth at the ends of the Branches many together, which are of a deep Scarlet, veined with ſmall yellow *Lines*.

The double *Honiſuckle* is ſo common, that every one knows it, nevertheleſs it is to be eſteemed, for its ſweet *Flowers*. The *Italian Honi-Suckle* is a very great ſpreader and bearer, but not of ſo ſweet a ſcent.

Virgins-Bower is much of the nature of the *Honiſuckle*; The *Flowers* are ſome Red, and others Purple; ſome double, and others ſingle.

Baſtard-Dittany is a ſmall Woody *Plant* that grows not above two *foot* high; It is of ſeveral ſorts, ſome beareth a reddiſh Flower; ſome a white and ſome an Aſh-colour *Flower*, they are all ſtrong ſcented.

The *Ciſtus* is alſo a ſmall Woody *Plant*, and is of two ſorts, the *Male Ciſtus*, and the *Gum Ciſtus*, which is the biggeſt and greateſt ſpreader. This is a tender *Plant* not enduring the cold Winter, which the *Dittany* will.

Other Flower-bearing Trees, and Shrubs.

THe *Horſe Cheſnut*, of ſome eſteem for its beautiful fair green *Leaves*, as alſo for its *Flowers* in *May*.

JUDAS TREE hath its *Flowers* before its *Leaves*, three or four ſtanding together like *Peaſe-Bloſſoms*, of a fine purpliſh bright red, which are ſucceeded by long flat *Cods*; This is apt to put forth *Suckers*, by which as alſo by *Layers* 'tis encreaſed; It ſeldom grows above ſix *foot* high.

BEAN TREFOILE is of two ſorts, the greater and the leſſer, and both put forth yellow *Flowers*, much like thoſe of *Broom*, but leſſer and paler, which are ſucceeded by flat thin *Cods*.

The great *Baſtard Sena* with *Bladders*, hath its *Flowers* in *May*, much like thoſe of *Broom*, after which appear clear thin and tranſparent *Bladders* with black *Seeds*.

Spaniſh Broom puts forth its *Flowers* towards the top of the *Branches* in *May*, which are much like the common *Broom*, but larger, and the *Cods* are long and ſmall. There is another kind that bears white *Flowers*.

The *BLADDER NUT*, if pruned up, and kept from *Suckers*, will grow to about ſix foot high; its *Flowers* are white and ſweet, many hanging down on a long *Stalk*: after them greeniſh *Bladders*, each containing one ſmooth ſmall *Nut* with a green *Kernal*; the Leaves are like thoſe of *Elder*. It is encreaſed by *Suckers*.

The *GILDER*, or *GILDERLAND ROSE*, is a pretty larg ſpreading Tree, at the top of the young *Branches* comes forth a round Ball of many ſingle white *Flowers* cloſe ſet together. It is a hardy Plant, and is encreaſed by *Suckers*.

The *SPRINGA*, or *PIPETREE* is of ſeveral ſorts, but none very tall; the chief difference is in the *Flowers*, one putting forth blew *Flowers*, another white, and another a kind of a fair Purple *Flower*, at the end of the ſmall *Branches* many together.

CHRISTS THORN groweth about five or ſix *foot* high, hath many ſlender *Branches*, ſet with broad and round *Leaves* veined, alſo thick ſet together on a long Stalk; This is that with which our *Saviour* was ſaid to be crowned. It is encreaſed by *Layers*.

The *MYRTLE-LEAVED SUMACH* riſeth from the Root yearly, with many ſmall *Branches* about four or five *foot* high, and at the top of the *Branches* come forth divers *Flowers*, which are ſucceeded by ſmall black *Berries*.

The *LARCH TREE* is a very ſlow grower, and not common; beareth amongſt its green *Leaves* beautiful *Crimſon coloured Flowers*, very pleaſant to behold.

I ſhall

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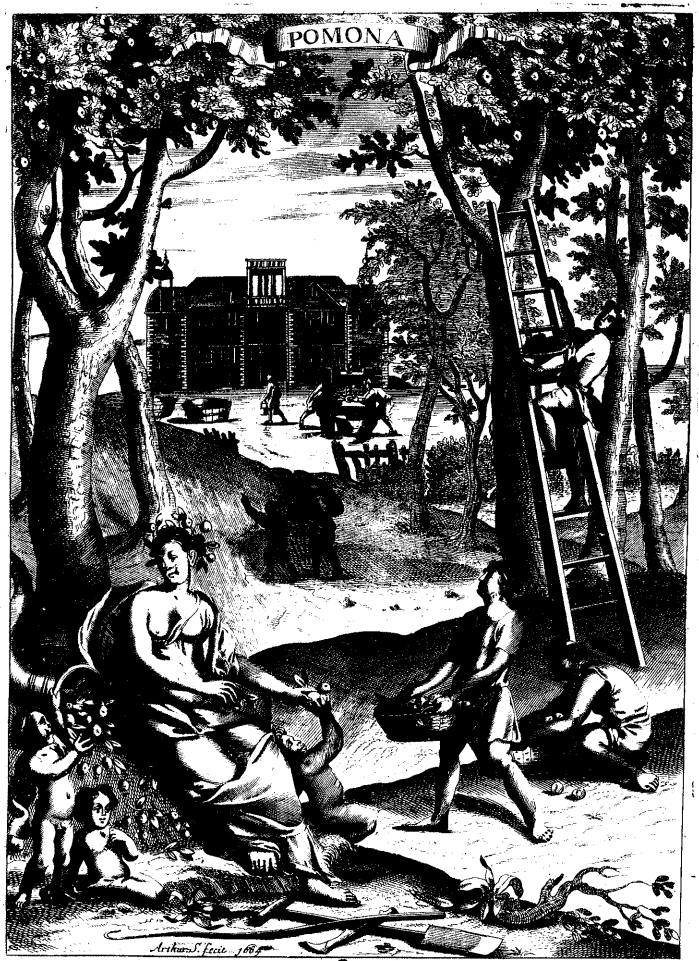

To the R^t Worshipfull Harden in Surry and of and Lord Major

Sr Robert Clayton of the Citty of London Knight there of Anno 1680.

This Plate is humbly dedicated by Richard Blome

I shall conclude this Chapter with some *Ever-Green Trees* worth the taking notice of.

EVER-GREEN TREES.

The *CYPRESS TREE* groweth *pyramidical*, and is much used in *Gardens*; 'tis propt up by a Pole which runs up in the midst, to which it is bound about with *Wyer*, but being a *Tree* so common, is known to all.

The *TREE of LIFE* is a slow grower, yet hath many hanging-down Branches, on the tops of which in *May* are small downy yellowish *Flowers* with standing small scaly heads. This *Plant* is encreased by *Layers*.

The *EVERGREEN OAK* is of a slow growth, and not very large; It beareth small *Mossy yellowish Flowers* in the Spring, and in some places small blackish *Acorns*. This is encreased by *Layers*.

HOLLY is common every where, but there is a sort that hath Green shining Leaves, variously marked with a *yellowish Colour*.

BOX is of several Sorts, the common *English* sort is known to all; the *Gilded Box*, whose Leaves are edged with yellow, and the *Dwarf Box*, which is much smaller than the former; and of this there is a gilded kind esteemed the best of all. All Sorts are easily raised; for every Slip set in *March* will take root and grow.

PYRACANTHA, or the *Ever-green Hawthorn*, if permitted to grow, will be about six *foot* high, full of *Branches*, beset with *Leaves* snipt about the *Edges*, and long sharp *Thorns*; The *Flowers* come forth in the Spring in Cluster, together, as the *Berries* are that succeed, being of a bright red: It is encreased by *Suckers*, *Layers*, and by sowing the *Berries* like as you do *Haws*. This *Green* with *Phyllirea* or *Privet*, makes a very good *Ever-green Hedge*.

The *STAFF TREE* is a small grower, and bears on a little Stalk four or five *yellowish green Flowers*, which turn into small *Berries*, like *Black Cherries*; 'tis of chief use for *Hedges* mixt with *Pyracantha*, and is encreased by *Layers*.

The *Ever-Green PRIVET* groweth low in a thick *Bush* full of *Branches*, and *Leaves*; the *Flowers* come forth many of them together at the *Joynts*, being small and white, which are succeeded by little *Black Berries*.

PHILLIREA or *Mock Privet* is of several Sorts, and all very good; the *Flowers* which are many together, are of a *Greenish yellow*, after which come small black *Berries*.

This *Green*, as also the *Ever Green-Privet* is excellent for *Hedges* in *Gardens*, by reason they may be cut, and brought to carry to any Form by the *Garden Shears*, and so kept in any compass by *Laths* or *Rods*.

The *LAWREL* and the *BAY* are very common, and well known, and much used for several occasions, the former being of much esteem for the adornment of *Houses*. They grow best against the sides of *Pales*, or a *Wall*, or a *House*, and in the Shade.

CHAP. IX.

Of FRUIT-TREES, and how to propagate and manage them, as to Planting, Grafting, Inoculating, Pruning, &c. with an Account of each sort of Fruit.

THere is no greater Improvement to be made on Ground, than the planting it with *Fruit Trees*, especially if rightly ordered, and good sorts of *Fruits* made choise of, which for the generality should be those that are durable, and will keep the Winter Season: and also such that are most fit to make *Cider* and *Perry* of. The charges and trouble of planting is inconsiderable to the great profit accrewing thereby. But the *Rustick* People will not easily be perswaded to go out of their old way, nor be at one Peny charge in expectation of a future Gain; Therefore it were to be wished that when any *Landlord* lets a Lease of any *Ground*, he would tie the *Tenant* by *Covenant* strictly to plant such a quantity of *Fruit Trees* on the Premises every Year in his *Hedg Rows*, or such like vacant places that will be no way prejudicial to the management of his *Crops*, were it but four *Trees* to an *Acre*, which is but an inconsiderable charge; and they are easily preserved from the Injury of *Cattle* by bushing or railing them about, which may be done by his own hands at spare Hours. But to proceed to the ordering and Raising them.

How to propagate Fruit-Trees.

DIvers ways may be used for the raising of *Fruit-Trees*, as by *Grafting*, *Inoculating*, or *Budding*; also by *Layers*, *Suckers*, and *Slips*; and likewise from the *Seed*, *Nut* or *Kernel*.

GRAFTING.

THe Art of *Grafting*, as also *Inoculating* doth preserve the Species of the most curious *Fruits*, and meliorates their *Gusts* or *Tasts*; for *Fruits* that are raised from the *Kernels* do produce most commonly a kind of wild *Fruit* ungrateful to the Palate, participating of the wildness of the Stock, on which the *Tree* was *Grafted*.

Sometimes *Apples*, and *Pears* may happen to be good, being raised from the *Kernel*; but for *Cherries*, *Plumbs*, *Apricocks*, *Peaches*, &c. produced from the *Stone*, or *Kernel*, unless *Grafted*, or *Inoculated*, are esteemed but of small value.

Things to be observed in Grafting.

YOur first business is to be provided with *Stocks*, which must be according to the nature of the *Tree*, you intend to *Graft*; for *Apples* the

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the *Crab stock* is the best; also *Stocks* raised from every sower *Fruit* may do, for they bear the best, and soundest *Fruit*, and the *Tree* will be the larger, and grow freer from the *Canker*.

If you would have *Dwarf Trees*, make choise of the *Paradise Apple*, either raised from the *Kernels*, or *Layers*, for the *Branches* are as apt to take Root as those of *Codlins*; But by reason the *Paradice Apple* is a slow grower, you may graft the *Cyon* thereof on a *Crabstock* close to the Ground, and when it is grown to the bigness of ones Finger, graft about eight *Inches* higher thereon, such *Fruit* as you would have, which will quicken the growth of the *Paradice Apple*, and cause the *Fruit* to be better.

PEARS are to be grafted on Stocks raised from the *Kernel*, the *White Thorn* commonly used is not good.

PLUMS are to be Grafted on *Plum Stocks* raised from *Suckers*, or the *Stones*, of which sort the great white *Pear-plum* is esteemed the best; and indeed any that have very large *Leaves* and *Shoots*, are good either to *Graft* any choise *Plums* upon, or for the Budding of *Peaches* and *Apricocks*.

CHERRIES are best to be *Grafted* on black *Cherry Stocks*; but *Stocks* of a better Nature may be raised from the Stones of the *Black-Heart*, the *Duke*, the *Amber*, and the *Morello Cherries*. For the *Grafting* the *May* and Early *Cherries*, the *Stocks* of the common *English Cherry* is said to be the best, but it is not so good for a *Wall* as the *Morello*, or other sorts, as growing too high.

MEDLERS are best to be *Grafted* on *Pear-Stocks*.

QUINCES are raised by *Cuttings*, or *Suckers*, which being set in good Earth, and kept watered if the Season proves dry, will not fail to grow; and when they have taken *Root* in Winter, remove them into your *Nursery*; and in a Year or two they will be fit to *Graft Pears* on for *Wall-Fruit*, being esteemed better than *Pearstocks*, as not growing so high.

APRICOCKS, *PEACHES* and *NECTERINES* are usually *Inoculated* in *Plum-stocks* raised from *Suckers*, or the *Stones*; and those of the white *Pear-plum*, as aforesaid is the best, as also for *Budding* of *Apricocks*, and *Peaches*; but for the *Nectarine* a *Pear-stock* is most proper.

GOOSBERRIES and *CURRANS*, as also *Services* are *Inoculated* on their own kind.

FILBERTS are raised from *Nuts* of their own kind, the like are *Walnuts*.

For the raising Stocks.

BEing provided with what quantity of *Stones* and *Kernels* you design to Sow about *October* (being then a good Season) let there be a Bed of *Earth* well prepared and dressed, and therein Sow the *Kernels* of *Crabs* or such like *Apples*, and cover them with fine *Mould* sifted over two or three fingers thick. And for *Fruitstones* you may prick them down in Rows two or three Fingers deep, with the sharp ends downwards; and in the Winter cover the *Beds* over with long *Dung* to preserve them from the cold *Frosts*, which when the Weather grows warm, as about *April*, must be taken off. You must keep them clean from *Weeds*, and in two *Years* they will be fit to remove into other *Beds*, to be Planted at greater distances for the conveniency of *Grafting*.

Cherry-stones are to be Sown, and ordered as *Apple kernels*: But before you Transplant any of these *Stocks*, you must cut off such *Roots* as run down, as also the Tops and side *Branches*, placing them in Rows, closing well the *Earth* about them; and be sure to set each kind apart, for the knowing what *Fruit* it is. When they are grown to a sufficient bigness, of about an *Inch* in *Diameter*, they may be fit to *Graft* in the *Cleft*; and set not the *Roots* too deep, as being more Troublesom to remove.

Crab, or *Apple-stocks* thus raised, are better than those that come from the Wood, or any other ways.

The *Nursery* thus set, may be ready after one Year to *Innoculate*, and after two or three Years to *Graft*.

Trees Grafted on a *Gennet Moyl*, or *Cider stock*, preserve best the tast of a delicate *Apple*, especially the *Pippin*; but on a *Crabstock* the *Tree* lasts longer, and hath a more tart palatable relish; the same Rule may be observed in the choise of Stocks for *Pears*, *Plums*, *Cherries*, *Apricocks*, &c. for the more *Acid* the *Stocks* are, the more life it gives the *Fruit*.

Although the *Fruit* doth generally take after the *Graft*, yet it is somwhat altered by the *Stock*, either for the better or worse.

The *Pear Grafted* on a *Quince-stock*, produceth its *Fruit* better than the same kind upon a wild *Pear-stock*, and fairer, much better coloured; and causeth the Trees to bear sooner, and more *Fruit*.

The Soyl of the Ground designed for the *Nursery*, ought to be considered, which should be a light Mould, not too rich, nor too barren, and that which lyeth warm, will cause the *Stocks* to thrive the better.

Gather your *Grafts* of *Plums*, *Pears*, and *Cherries* from mid *January*, to mid *February*, but those of *Apples* may continue till *March*.

Choose such as are of two Saps, that the old *Wood* to the knot may be placed in the *Stock*; those of one Years *Shoot* will serve in default of the other; but such will be longer before they come to bear. Make choise of such *Grafts* that are strongest, and from such Branches that are fullest of *Fruit Buds*, and aptest to bear; and bind every sort of *Graft* in bundles by it self, with the Name of the *Fruit* writ on a *Parchment Label*, lest you should forget the sort; and for your greater care a Book should be kept, where each sort is entred down. These *Grafts* should be put in the *Earth* by themselves about half ways, for preserving them fresh until you shall use them.

Grafting is an Artificial placing the *Cyon*, or *Graft* of one kind upon the Stock of another, so as the Sap of the Stock may without Impediment come to nourish the *Graft*. It is therefore necessary (the Sap passing betwixt the *Bark* and the *Wood*) that they be exactly joyned, and well bound together, which may be thus done.

The time and Manner of Grafting.

THe best time to Graft is in *February*, and *March*, but forward *Fruits* may be *Grafted* in *January*; and some backward *Fruits* in the beginning of *April*, provided the Spring be not too forward; for the Temperature of the Season doth very much conduce to the growth or proof of the *Graft*, as mild Weather in *December*, or *January* may be better than *Frosty* Weather in *February*; and indeed such kind of Weather is not fit to *Graft* in.

Grafts of any kind being cut before they begin to Spring, may be kept many Days; and carryed a good distance, being bound up in bundles in *Moss*, and the ends wrapt up in Clay, or Stuck in a *Turnip*; and although they are a little withered, yet they will prove not the worse.

Having your *Stocks* or *Grafts* in readiness, as also all your *Tools* and *Materials*, as the *Pruning-Knife*, *Pen-Knife*, a fine *Saw*, a *Mallet* and a *Wedge*, also *Rushes*, strong soft *Flags*, or Woollen *Yarn* to bind the *Graft* and *Stock* together; and *Clay* well tempered with *Hors-Dung*, to keep it from *Choping* in dry Weather, or soft *Wax* for smaller *Trees*, you may proceed to your work, which may be performed several ways.

The first and most usual is *Grafting* in the *Cleft*, especially for the middle sized *Stocks*, and after this manner; First saw off the Head of the *Stock* in a smooth place, which for *Wall* or *Dwarf Trees* should be within four Fingers of the Ground, and for *Standards* much higher according to the growth of the Stock; then pare away with your *Knife* the Roughness that the *Saw* hath left on the Head of the Stock, which done, cleave the Head a little besides the *Pith*, and put therein a long *Wedge* of hard *Wood* to keep the Cleft open; which cut smooth with the point of your Knife, that the sides may be even; then cut the *Graft* on both sides from some *Knot* or *Bud* in form of a *Wedge*, in length proportionable to the Cleft with shouldrings; which *Graft* being so cut, place exactly in the Cleft, that the inward Bark of the *Cyon* may closely joyn to the inward part of the Rind, or *Bark* of the *Stock*, in which lyes the principal skill of the *Grafter*; then draw out the *Wedge*: But if the *Stock* pinch hard, lest it should endanger the dividing the *Rind* of the *Graft* from the *Wood*, to the spoiling the *Graft*, let the inward side of the *Graft* that is within the *Wood* of the *Stock* be left the thicker, that so the Woody part of the *Graft* may bear the Stress; or there may be a small *Wedge* left to keep it from pinching the *Graft* too hard; and likewise leave the outside of the *Graft* a little the thicker; and in this business great care is required. The *Graft* being thus fixed into the *Stock*, your next and last business is to cover the Head of the *Stock*, with the Tempered *Clay* or soft *Wax* for the small *Grafts*, and leave not the *Grafts* too long.

There is another way of *Grafting* much like the former, which is *Grafting* in the *Bark* or *Rind* of the greater *Stocks*, and differs only in this, that where you cleave the *Stocks* and fasten the *Grafts* within the *Cleft* in the other way, here with a small *Wedge* made of *Ivory*, *Box*, or some hard *Wood* cut Taperwise, with a thin point you force into the *Stock* between the *Rind* and the *Wood* after the Head thereof is sawn off, and the roughness pared away. Then take the *Graft*, and at the shoulder or grossest part thereof, cut it round with your small *Grafting-Knife*; and take off the *Rind* wholly downwards, preserving as much of the inward *Rind* as you can; then cut the *Wood* of the *Graft* about an *Inch* in length, and take away half thereof to the Pith, and the other half Taper it away, and set in the place you made with your *Wedge*, between the *Bark* of the *Stock* and the *Wood*, that the shouldring of the *Graft* may *joyn* close to the *Bark*, or *Rind* of the *Stock*, and then cover it with Clay, as before directed. This way is best to be used when the *Stock* is too big to be cleft, and where the *Bark*, or *Rind* is thick; and here you may set into one *Stock* many *Grafts*, and that of several sorts, if you so think fit.

Your great care must be to keep the Top of the *Stocks* close covered for some time, until the *Bark* it self hath covered it; for otherwise the *Rain* will Rot the *Stock*. And do not leave the *Grafts* above four or five *Inches* above the *Stocks*, for if too long, they draw more feeble, and are more exposed to the injuries of the Weather, neither do they prosper so well. And observe to *Graft* your *Cyons* on the side of the *Stock*, that may receive the least damage from the South-west wind, so that it may blow into the *Stock*, and not from it.

There is another way of *Grafting*, called *Shoulder*, or *WHIP-GRAFTING* fit only for small *Stocks*, and to be performed somwhat later than the former; and this may be done two several ways; first by cutting off the Head of the Stock, and smooth it as in *Cleft-Grafting*; then cut the *Graft* from a *Knot*, or *Bud* on one side sloping, about one *Inch* and a half long, with a shouldring smooth and even sloping by *Degrees*, that the lower end may be left thin; place the shouldring of the *Graft* upon the Head of the *Stock*, and mark the length of the cut part of the *Graft*; and with your *Knife* cut away so much of the *Bark*, as the cut side of the *Graft* did cover, but touch not the Wood of the *Stock*; then place both together, that their Saps may exactly joyn; then bind them together with your *Rushes*, *Flags*, or *Yarn*, and cover the Heads over with Clay, as afore directed.

The other way of *Whip-Grafting*, is where the *Grafts* and *Stocks* are of an equal size, the *Stock* must be cut sloping upwards from the one side to the other; and the *Graft* after the same manner from the shoulder downwards, that the *Graft* may exactly joyn with the *Stock* in every part; which done, bind them about with your *Flags* or *Rushes*, and put Clay about them as aforesaid.

This way of *Whip-Grafting* is esteemed better than *Grafting* in the *Cleft*, and for these Reasons, 1. This way requires smaller *Stocks*; 2. It is less

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injurious to the *Stock* and *Graft*; 3. The Wound is sooner healed, and is better defended from the injuries of the Weather; and 4. It is more easy to learn, and to be performed.

There is another way of *Grafting* called *Grafting by Approach*, or *Ablactation*, and this is done in *April*, sooner or later according to the State of the Spring. It is to be performed where the *Stock* you intend to *Graft* on, and the *Tree* from which you take your *Graft* or *Cyon*, stand so near together that they may be conjoyned; then take the *Sprig* or *Branch* you intend to *Graft*, and pare away about three *Inches* in length of the *Rind*, and *Wood* near the Pith; cut also the *Stock* or *Branch* on which you intend to *Graft* after the same manner, that they may joyn exactly together, and that the Sap may meet; and so bind them about, and cover them with Clay, as aforesaid.

So soon as you perceive the *Graft* and *Stock* to unite and incorporate together, cut off the Head of the *Stocks*, hitherto left on, about four *Inches* above the binding, and in *March* following the remaining stub also together with the *Graft* or *Cyon* underneath, close to the grafted place, that it may only subsist by the *Stock*.

Some use to cut off the Head of the *Stock* at first, then joyn the *Cyon* thereunto, after the manner of *Shoulder-Grafting*, differing only in not severing the *Cyon* from its own *Stock*; both ways are good, but the first most successful.

This manner of *Grafting* is chiefly used in such nice and tender *Plants*, as are not apt to take any other way, as *Lemmons*, *Oranges*, *Pomegranets*, *Vines*, *Jessamines*, and the like.

You must remember that those *Grafts* that are bound you must unbind about *Midsummer*, otherwise the Band will injure them.

There is a new way of *Grafting*, which is thus done; Take a *Graft* or *Sprig* of a *Tree* you design to propagate, and a small piece of the Root of another *Tree* of the same kind, or very near it, and *Whip-Graft* them together, and bind them well, and plant it where you intend it shall stand, or else in your *Nursery*, which piece of Root will draw sap and feed the *Graft*, as doth the *Stock* after the other ways.

Be sure to untie the two But-Ends of the *Graft* and the *Root*, and that the *Rind* of the *Root* joyn to the *Rind* of the *Graft*. By this means the *Roots* of one *Crab* or *Apple-Stock* may serve for twenty or thirty *Apple Grafts*. In like manner you may do for *Cherries*, *Pears*, or *Plums*.

And thus you may raise a *Nursery* of *Fruit-Trees* instead of *Stocks*; and it is esteemed better for the raising of Tender *Trees*, that will hardly endure the *Grafting* in the *Stock*; for here they are not exposed to the injury of the *Sun*, *Wind*, or *Rain*; Also *Trees*, thus *Grafted* will bear sooner, and the better for *Dwarf-Trees*.

This way is easily performed, and may be done in great quantities in a little time within Doors, and then planted in the *Nursery* in Rows and Beds, as you do your *Stocks*.

Of INNOCULATING, or BUDDING.

THis way of *Innoculating*, or *Budding* is by many preferred before *Grafting*, by which means several sorts of delicate Fruits are propagated and meliorated, which cannot be done by *Grafting* in the *Root*; as the *Peach*, *Apricock* or *Nectarine* rarely thrive any other way than this, because few Stocks can feed the *Graft* with *Sap* so early in the Spring as the *Graft* requires; but being rightly *Innoculated* in the fulness of the *Sap* seldome fails.

The *Stocks* to *Innoculate* on are to be the same kinds, as directed to *Graft* on, but the *Peach* takes best on its own kind, and the *Nectarine* on a *Peach Stock*.

The best time for this business is from *Midsummer* to mid *July*, when the *Sap* is strongest in the *Stock*, and bark easiest to be raised, and tis best to be done in a dry Season, and in the Evening, for *Rain* is very pernitious to the *Buds*; also the *Buds* must not be too young nor tender, but sufficiently grown. Those of the *Apricock* are the soonest ready, and must be taken from strong and well-grown Shoots of the same Year.

The *Tools*, or *Instruments* required in this curious Art are the sharp pointed *Penk-nife*, a *Quill* cut half away and made sharp and smooth at the end, to divide the *Bud* and *Rind* from the Stalk, and Woollen Yarn, *Flags*, or the like to bind them with all.

Having your *Instruments* and *Buds* in readiness, you may proceed to your Work after this manner, on some part of the *Stock*, either near or further from the Ground, according as you intend it, either for a *Wall*, *Dwarf Tree*, or *Standard*, and from the middle thereof gently Slit the *Bark*, or *Rind*, about an *Inch* long in form of a *T*, not wounding the *Stock*; then nimbly prepare the *Bud* by cuting off the Leaf, and leave only the Tayl, about half an *Inch* from the *Bud*; then Slit the *Bark*, on each side the *Bud*, a little distance from the *Bud*, and take away the *Bark*, above and below the *Bud*, like a *Sheild*, that it may the more easily go down, and unite between the *Bark*, and the *Stock*; then with your *Quill* dexterously take off the *Bark* and *Bud*, that you leave not the *Root* behind; for if you see a Hole under the *Bud* on the inside, the *Root* is gon; cast it away, and prepare another. When your *Bud* is ready, raise the *Bark* of the *Stock* on each side in the *Slit* (preserving as carefully as you can the inner thin *Rind* of the *Stolk*) put in with care the *Bud* between the *Bark* and the *Stock*, thrusting it down until the top joyn to the cross Cut, then bind it close with your *Yarn*, or *Flags*, but not on the *Bud* it self.

There is another way of *Innoculating* which is more easy, and successful than the former, from which it differs only that the *Bark* is Slit upwards, from the cross Cut, and the *Bud* put upwards, leaving the lower end longer than may serve, and when it is in its place, cut off that which is superfluous, and joyn the *Bark* of the *Bud* to the *Bark* of the *Stock*, and bind it as before directed.

There

There is also another way, which is to cut the Edges of the *Bark* about the *Bud* Square, and cut the *Bark* of the *Stock* fit to receive it binding it fast, and this is a sure and easy way.

About three *Weeks*, or a *Month* after *Innoculating* unbind the *Buds*, and in the unbinding them you may see which are good by their lively appearance. In *March* following cut off the *Stock* about three *Fingers* above the *Bud*, and the next year cut it close, that the *Bud* may cover the *Stock* as *Grafts* usually do.

Fruits raised from Seeds, Stones, Nuts, and Kernels.

SUch *Fruits* that are raised from *Seeds*, *Stones*, *Nuts* and *Kernels*, are *Almonds*, *Services*, *Chesnuts*, *Walnuts*, *Filberts* and common *Nuts*; likewise *Oranges* and *Lemmons*; all which are to be sown in *Beds*, and from thence transplanted into your *Nursery* at convenient distance, where they are to stand until fit to be transplanted.

The best way to raise *WALNUT-TREES* is from the *Nut*; which from the time of gathering you may keep in a *Bed* of *Sand*, or *Earth*, until *March*, and then plant them; and if you can, in the places where you intend they shall grow, (for transplanting them doth much check their growth). You must have a great care to preserve them from *Mice* which are great destroyers of them.

FILBERTS and *NUTS* are raised also from the *Nut* the same way as *Wall-Nuts*; the like are *Chesnuts*, &c.

Fruits raised by Layers, Slips and Suckers.

THere are several sorts of *Fruit Trees* raised with more ease from *Layers*, *Slips* and *Suckers* than by *Grafting*, *Innoculating*, or from *Seed*, and such are *Vines*, *Figs*, *Mulberies*, *Barberies*, *Currans*, *Raspberys*, *Goosberys*, *Quinces*, *Codlins*, *Gennet-Moyls*, &c.

For *VINES* any shoot of the last Year (especially if a short piece of the former Years groweth be cut with it) will grow, being laid in *February* about a foot and a half within the Ground long-ways, and not above two or three *Buds* at the most out of the Ground; but you must be very careful to keep them watered in the heat of the *Summer*.

The *FIG-TREE* yields *Suckers*, which is the usual way to encrease them.

The *MULBERRI-TREE* is very difficult to raise; 'tis best thus done. Cut a *Bough* off, as big as a Mans Arm, which cut into pieces about a Yard long, and lay into the Ground (that is rich) about a Foot deep, with one end about a handful broad out of the Ground, and after a Year or two being kept watered in a dry Summer Season, divers young Sprigs may be drawn with *Roots* fit to transplant, and the old *Roots* will yet send out more.

The *BARBERT Tree* is raised from *Suckers* laid into good Earth, as before directed.

RASBERRIS, *GOOSBERRIS* and *CURRANS* are also raised from *Suckers*, being all great encreasers.

The *CODLIN*, as also the *GENNET-MOIL* are easily raised by *Suckers*, and *Slips*, being apt to thrive in any Ground, but that which is moist is best agreable with their nature.

QUINCES, like unto *Codlins*, are easily propagated from *Suckers*, which being set in any moist place, will soon draw Root.

Of Transplanting Trees.

THe best Season to *Transplant* and set *Trees* is from Mid *October* to the end of *January*, if the Weather be open; and if the Spring is not too forward in *February*.

In taking them up out of your *Nursery* be careful that the *Roots* be not cut, or broken, especially the *Spreading Roots*, and let the *Roots* be left longer than the Heads, and the more ways they Spread, the better; but such *Roots* as run downwards may be taken off; likewise the ends of those that you find too long, as also most of the small Threads where they grow too thick: you must likewise prune as well the *Branches* as the *Roots*.

The Ground being prepared where the *Trees* are to be set, raise a small Hill in the Center of each Hole, which should be wide made, and thereon set the *Tree*, opening and spreading the *Roots* round about it, and cover them with the best Earth, and shake the *Tree*, that the *Roots* lie not hollow, treading it down to fasten them.

Plant not too deep, especially in such Ground that is *clayish*, over-moist or *spewy*; as also *Gravelly*, or *Chalky*; but as near the surface as you can, or above it, raising the Earth about the *Tree*; which way one Sr. *Josias Child* of *Wanstead* in *Essex* a great Planter hath observed (to the admiration of Beholders) his Ground lying upon a *Gravel*; for if *Trees* are too deep planted, they generally pine away.

It is very necessary to be observed that the Ground where you plant your *Trees* should be of a richer, and higher Mould than the *Nursery* from whence you take them; otherwise they will not thrive so well. It is also a great check to take them out of a warm *Nursery* and transplant them in an open wide Field free from shelter.

As near as you can, choose young thriving *Trees*, rather than those that are large, for an *Orchard* of such young ones will soon overtake one planted with larger *Trees* at the same time.

The Mode of planting is now upon a Square, so that you have a *Row*; look which way you will; and for distance thirty or forty foot is very well, for then you may make some benefit of the under Ground, either by *Grass* or *Tillage*. Likewise the *Trees* will have more benefit of the *Sun* and *Air* than when planted too near or irregular, and by consequence will thrive the better, and the *Fruit* will be the fairer and better tasted.

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You may set your *Apple Trees* at thirty *foot* distance, and between every *Tree* set a *Chery Tree*, which Method is now much used; for by the time that the *Apple Trees* will spread to require the place of the *Chery Trees*, the *Cheries* will have done bearing, which will be in about Twenty Years time; and then they may be cut down and grubbed up, so that you have then a fine *Apple-Orchard*. And be sure let the *Rows* be of one intire sort of *Fruit* and not mixed, which is very convenient for the gathering the *Fruit*, and laying them together in sorts.

PEARS are to be set as *Apple Trees*, with a *Chery* betwixt; But for *Plums* they may be set in the *Angles* of the Ground, or in *Hedgrows*.

FILBERTS are best to be set to make a *Walk*, the like may *Walnuts*; and *Codlins* are set at a closer distance, being good to make *Hedgrows*.

WALLFRUIT are to be Planted at such a distance as the hight of the *Wall*, and the Nature of the *Fruit* requires; for the higher the *Wall* the nearer together, and the lower the farther, that they may have room to spread in breadth, which they want in height.

Of Pruning, Plashing, and ordering of Trees.

IT is found by Experience, that the *Pruning* of *Trees*, and taking away their dead and unnecessary Branches, doth much better their growth.

If you would not have the *Grafts* and *Twigs* to mount up too high, you may pinch off their tender Tops, which will cause them to put forth side *Branches*.

In *March* is the best time to take away the small and Superfluous Branches, giving them a *Luce* close behind the *Bud*, which is much to be observed in *Pruning*.

The old *Trees* may be *Pruned* in *October*, and *November*; and thence forward until the rising of the Sap.

Wall-Trees are to be *pruned* in *Summer*, taking away those Superfluous shoots of the same Years growth, that hinder the ripening of the *Fruit*; and in the *Winter* after the Fall of the Leaf you may *prune* and take away the residue of the Branches that are unnecessary, placing those that are fit to remain in order.

Some are of Opinion that the best time for this business, and to nayl the *Boughs* to the *Wall*, is in *February*, after the great *Frosts* are past, except *Peaches* and *Nectarines*, which must be *pruned* when the *Buds* begin to put forth; for if sooner, it will endanger the killing them.

In *pruning* of *Trees* (especially *Wall-Trees*) be sure to leave the small *Twigs* that are short and knitted to Blossom the succeeding Year; for if you observe such *Twigs* have the most *Fruit*, being usually of two Years growth. But cut off all gross Shoots that will not be easily brought to the *Wall*.

In *Pruning* the *VINE* leave some new Branches every Year, and take away (if too many) some of the old, which will much further its bearing; And when you cut your *Vine*, leave two *Knots*, and cut at the next Interval; for usually the two *Buds* yield a Bunch of *Grapes*, and when (through Ignorance) they are close cut, as for Beauty sake, they commonly bear few or no *Grapes*.

The *Pruning* of *Trees* doth much depend on the Discretion of the *Person*, who is to consider the growth of every *Tree*; and what may most conveniently be taken away without leaving the *Walls* bare.

Divers necessary things to be observed about Fruit-Trees.

THE *Roots* of such *Trees* that Thrive not, nor bear well, may be laid open about *November*; and if the Ground be poor in the *Spring*, lay thereto good Fat *Mould*; but if the Ground be too rich, so that the *Tree* spends it self in *Leaves* and *Branches*, and bears but little *Fruit*; then put to the *Roots*, *Lime*, *Ashes*, or any *Manure* that is *Hot*, *Salt* and *Dry*, being mixed with the *Earth*.

Digging about the *Roots* of the *Trees*, adds much to their Fertility, and prevents *Moss*.

Stones laid in heaps about the *Roots*, preserve them cool and moist in Summer, and warm in Winter; and cause great Fertility.

If your *Orchard* is not Naturally warm Scated, and defended from Winds by *Woods*, *Hills*, or the like; I would advise you when first you Plant your *Orchard*, to raise about it a good *White-Thorn Hedge*, which in a few Years will be a good shelter. Also at some distance beyond the Hedge Plant a Row of *Wal-Nut*, *Chesnut*, *Popler* or *Lime-Trees*, which growing higher than the Hedge, will the better break off the Wind; But Plant the *Trees* at such a distance from the Hedge, that the dropings of the Leaves may not fall upon it, which will spoil its growing.

If the *Tree* be *Bark-bound*, and doth not thrive, slit the *Bark* down the Body of the *Tree* with your *Knife* in *April* or *May*, which will cure it.

If the cleft where the *Tree* was Grafted, or any other wounded place be neglected, the Rain is apt to engender the *Canker*, which is hard to cure, if far gone; and if cutting off the *Cankered Branches* will not do (it being so much infected) the best way is to cut it down for the Fire, and Plant another in its Room.

In *Dunging* of *Fruit-Trees*, the Soyl should be laid not close to the Body, but at some distance where the *Roots* run; and strong and hot *Dung* is not so good, as that well rotted and cold, especially for hot Grounds, but the Soyl of the *Streets* is far better.

For causing old decayed *Trees* to bear well again, about the end of *October*, or beginning of *November*, *Prune* the *Trees* from their decayed, bruised, and Superfluous *Branches*; also scrape off the *Moss*, which is as bad as *Ivy* is to the *Oak*; then dig the *Earth* about the *Trees* at least a Yard round, and about a Spit deep; and let it lye

lye open all the Winter until mid-*March*, then give the *Trees* a good Watering, at least a *Barrel* to a *Tree*, then lay on some good rotten *Dung*, and cover it over with the *Earth*, then about the end of *May* give each *Tree* the like Watering, and this will cause them to bear to Admiration.

To prevent the *Bliteing* of *Fruit*, when you find there is an Easterly, or a Northeasterly *Wind*, take three or four Armfulls of Musty Straw, or *Fern*, and that side of the *Orchard* that the *Wind* blows on, lay the said stuff in three or four places, according to the bigness of the *Orchard*, and so set Fire to it; and the *Wind* will drive the Smoak and smother through all the *Trees*; and thus do every Day so long as the *Wind* continues in that quarter; and it will prevent all *Blites*, and all manner of *Flies* and *Catterpillers* that these *Winds* bring.

Orchards that lye low, and near *Rivers*, have their *Fruit* waterish, puffy, and subject to perish; to prevent which, in *October* or *November* lay open the *Roots* of the *Trees* about a Yard and a half in compass, and at least a Spit deep, then fill up the place with Chalk, and let it lye open all the *Winter* for the *Frost* to chasten it, and to Incorporate the better with the *Earth*; and about the end of *March* throw the *Earth* upon the Chalk, and give each *Tree* a good Watering, and your *Fruit* will be of another tast for goodness; and will also be firm, and last as long as if grown on higher Ground.

Having given you sufficient Instructions for the *Ordering*, *Grafting*, and *Inoculating* of *Fruit-Trees*, I shall conclude this *Chapter* by giving an Account of the several sorts of *Apples*, *Pears*, *Plums*, &c.

Sorts of APPLE-TREES.

GReat are the Variety of *Apples*, as indeed of all other *Fruits*, some coming early for Summer *Fruit*, and others late for Winter *Fruit*. A Catalogue of the choicest is as followeth.

The *Juniting*.
The *King Apple*.
The *Margaret or Magdalen*.
The *Famagusta*.
The *Giant Apple*.
The *good Housewife*.
Pome de Rambures.
The *Winter Queening*.
The *Quince Apple*.
The *Carlisle Pepin*.
The *Bridgwater Pepin*.
The *Kirton Pepin*.
The *Golden Pepin*.
The *Kentish Pepin*.
The *Holland Pepin*.
The *Green Pepin*.
The *Roman Pepin*.
The *French Pepin*.
The *Italian Pepin*.
The *Black Pepin*.
The *Russet Pepin*.
The *Summer Pepin*.
The *Beauford Pepin*.
The *Lincoln Rennet*.
The *Golden Rennet*.
The *Great Rennet*.
The *Kentish Rennet*.
The *Russet Rennet*.
The *Red Russet*.
The *Round Russet Harvey*.
The *Harm Russet*.
The *Nonsuch*.
The *Royal Pearmain*.
The *Summer Pearmain*.
The *Winter Pearmain*.
The *Lowins Pearmain*.
The *Apple Royal*.
The *Darling*.
The *Angels Bit*.
The *Blandril*.
The *Tear Apple*.
The *Marygold Apple*.
The *Pulman Apple*.
The *John Apple*.
The *Pomewater*.
The *Sage Apple*.
The *Marygold*.
The *Marygold Stocken*.
The *Rose Apple*.
The *David Apple*.
The *Davy Gentle*.
The *Flower of Kent*.
The *Henrietta Maria*.
The *Old wife*.
The *Gillyflower*.
The *Gaunt Apple*.
The *Kitchin Apple*.
The *Powel Apple*.
The *White Coster*.
The *Gray Coster*.
The *Red Coster*.
The *Violet Apple*.
The *Cotten Apple*.
The *Pome Roy*.
The *Boughton Greening*.
The *Harvy Apple*.
The *Summer Belle Bon*.
The *Winter Belle Bon*.
The *Breading*.
The *Spising*.
The *Master John*.
The *Master William*.
The *Bardfield Queening*.
The *French Goodwin*.
The *Worcester Apple*.
The *Sugar Apple*.
Sops in Wine.
The *Paradice Apple*.
The *Fig Apple*, which is without *Core*, or *Kernel*, and without *Blossom*, the Fruit coming out of the sides of the *Branches*, as big as a *Pepin*.

Several sorts of PEARS.

For the Table.

The *Summer BonChristien*.
Burgomet de Buga.
The *Great Burgomet*.
The *Summer Burgomet*.
The *Winter Burgomet*.
The *Orange Burgomet*.
Brezid Heri.
Bæure de Roy.
The *Green Bæure Pear*.
The *Violet Pear*.
The *Binfield*.
The *Greenfield*.
The *Great Musk Pear*.
The *Great Russet of Renes*.
The *Amodotte*.
The *Bloody Peat*.
The *Rousellet*.
The *Winter Bon Christien*.
The *Pourtail*.
The *Dead Mans Pear*.
The *Winter Musk*.
The *Dionier*.
The *Double Flowered Pear*.
The *Dutate*.
The *Primating Pear*.
The *Red Genering*.
The *Diego Pear*.
The *Green Chissel*.
The *King Katherine*.
The *Queen Katherine*.
The *Russet Katherine*.
The *Anthony Pear*.
The *Berry Pear*.
The *Morley Pear*.
The *Windsor Pear*.
The *Musk Pear*.
The *King Pear*.
The *Summer Poppering*.
The *Green Poppering*.
The *Royal Pear*.
The *Pinp Pear*.
The *Prick Pear*.
The *Whorwood Pear*.
The *Colveil Pear*.
The *Tradescans Pear*.
The *Slipper Pear*.
The *Twelve penny Pear*.
The *Inglefield Pear*.
The *Norwich Pear*.
The *Orang Pear*.
The *Swaise Pear*.
The *Nonsuch Pear*.

The Pears for Baking.

The *French Warden*.
The *Spanish Warden*.
The *Great Warden*.
The *Red Warden*.
The *White Warden*.
The *Green Warden*.
Parkinsons Warden.
Godboults Warden.
The *Red Roman Warden*.
The *Quince Pear*.
The *Painted Pear*.
The *Tunip Pear*.
The *Canterbury Pear*.
The *Bell Pear*.
The *Black Pear of Worcester*.
The *Winter Katherin*.
The *Baking Greenfield*.
The *Great Surrein*.

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Other choise Pears brought out of France.

The *Ambrette.*
The *Averac.*
The *Amadote.*
The *Burgomot de la Grilliere.*
The *Burgomot de Suisse*
The *Burgomot de Bugi.*
Bœurre de Autumn.
Bœurre d' Hyver.
Bezidery.
Beziderassion.
Bon Chretin d' Espagne.
Bon Chretien d' este Musq;
Bourdon Musque.
Brouta Bon.
Petite Cuisse Madame.
Double Fleur.
Epine d' Hyver.
Frondente de Bresse.
Lansac.
Martinsec.
Monsieur.
Petite Musquat.
Roy d' Este.
St. *Michael.*
Virgonleuse.
Vert Longue.
Messire Jean.

Several sorts of PLUMS.

Yellow and white *Plums*
The *Amber Primordian.*
The *Prunella.*
The *Diapered Plum.*
The *Marbled Plum.*
The *Peasecod Plum.*
The *White Date.*
The *Tellow Date.*
The *White Pear Plum.*
The *Dutch Plum.*
The *Apricock Plum.*
The *White Mirabolin.*
the *Red Date.*
the *Nutmeg Plum.*
Blew Plums.
the *Violet Plum.*
the *Primordian.*
the *Perdrigon.*
Greenish Plums.
the *Damosine.*
the *Green Osterly.*
the *Green Perdrigon.*
the *Verdoch.*
the *Peasecod Plum.*

Red Plums.	Black Plums.
The *Red Primordian.*	The *Morocco Plum.*
The *Red Muskle Plum.*	the *Barbary Plum.*
The *Cheston Plum.*	the *Black Damosine.*
The *Kings Plum.*	the *Black Prunello.*
The *Queen Mother Plum.*	the *Muscle Plum.*
the *Damasco Plum.*	the *Catalonian Plum.*
the *Foderingham Plum.*	the *Pole Plum.*
the *Imperial Plum.*	the *Turkey Plum.*
the *Gaunt Plum.*	the *Black Tear Plum.*
the *Red Peasecod Plum.*	the *Pruine Damson.*

Several sorts of CHERIES.

The *May Chery.*
the *Early Flanders Chery*
the *Latter Flanders Chery.*
the *Flanders Clusser Chery.*
the *Preserving Chery.*
the *Morello.*
the *Duke.*
the *Arch Duke.*
the *Carnation.*
the *Lukeward.*
the *Black Heart.*
the *White Heart.*
the *Red Heart.*
the *Black Spanish.*
the *Bleeding Heart.*
the *Prince Royal.*
the *Portugal Chery.*
the *Kings Chery.*
the *Corone.*
the *Biquar.*
the *White Spanish.*
the *Amber.*
the *Hungarian of Zwerts.*
the *Ciliegi Birrielone.*
the *Dwarf Chery.*
the *Black Chery of Orleance.*

Of several sorts of QUINCES.

the *English Apple Quince.*
the *Barbery Quince.*
the *Brunswick Quince.*
the *Lions Quince.*
the *Portugal Pear Quince.*
the *Portugal Apple Quince.*

Several sorts of APRICOCKS.

THe common sorts known to all.

The *Algier Apricock* is a small forward *Fruit.*

The *Masculine Apricock* also an early *Fruit.*

The *Long Apricock* much like the *Masculine.*

The *White Apricock* better than the common sort.

The *Orang Apricock*, so called from its deep colour.

The great *Roman Apricock*, a fair *Fruit* good to preserve.

Several sorts of PEACHES.

THe *Nutmeg Peach* is of two sorts, one white and first Ripe, the other red on the side next the *Sun.*

The *Troy Peach*, also an early *Fruit*, and larger than the *Nutmeg-Peach.*

The *Savoy Peach* hath a fair *Fruit*, is early Ripe, and of a redish yellow colour.

The *Modena Peach* comes from the Stone, is of a yellowish colour, and excellent tasted.

The *Orleance Red Peach* leaves the Stone, being a fine Stone.

The *Morello Peach* cleaves from the Stone, and is a fair redsided *Fruit.*

The *Navar Peach* cleaves from the Stone, and is of a whitish colour.

The *Magdalen Peach* is much of the Nature of the *Navar.*

The *Carnation Peach* is a very good Standard.

The *Alberges Peach* leaves the stone, and is a fair yellow *Fruit.*

The Violet *Musk Peach* is red on the out side, and yellow within.

The *Persian Peach* is a fair yellow *Fruit*, but cleaves to the Stone.

The white *Monsieur* is red within, and white without.

The *Burdeaux Peach* is a large *Fruit* of a dark yellow, but red at the Stone.

The *Verona* is a very good red *Peach.*

The *Smyrna* is a very good yellow *Peach.*

The *Rambouillet* is a good dark yellow *Peach.*

The *Peach de Pavie* is a good yellow *Peach.*

The *Slane Peach* is a good yellow large *Peach.*

The *Fryers Peach* is an excellent *Fruit.*

The *Crown Peach* is a fair *Fruit.*

The *Newington Peach* is a fair and excellent *Fruit*, of a greenish white, and red next the *Sun.*

The *Billice Peach* is something of the Nature of the *Newington*, as is the *Crown Peach.*

The *Queens Peach* is a good large *Fruit*, of a redish yellow colour.

The *Isabellaa Peach* is a very good tasted *Fruit*, of a fair redish yellow colour.

The

The *Violat Muscat* of a fine Violet colour, and is a good *Fruit.*

The *Cubrane Peach* is a good red coloured *Fruit.*

The *Roman Peach* is a fair yellow coloured *Fruit.*

The *Man Peach* is an excellent tasted *Fruit.*

The *Musk Peach* is a large beautiful and good tasted *fruit.*

The *Quince Peach* so called as resembling the *Quince.*

The *Portugal Peach* is a good redish coloured *Peach.*

The *Lavar Peach* is the same with the *Navar Peach.*

The *Peach Despot* is yellow spotted with red.

The *Royal Peach* is a large *fruit* like the *Queens Peach.*

Several sorts of NECTORINES.

THe *Green Nectorine* is of two sorts, the bigger and the lesser, which is of small esteem.

The *Yellow Nectorine* is also of two sorts, the large and the small, which is the best, and cometh from the *Stone.*

The *White Nectorine* is not much better than the great yellow.

The *Paper White Nectorine*, is a smaller *fruit* than the *White*, but better tasted.

The *Painted Nectorine* is of a good tast, and is full of red Spots.

The *Red Roman Nectorine* is a fair and well tasted *fruit*, of a Musky scent, and of a fine red colour on the out side.

The *Red Nectorine* is an excellent *fruit*, and leaves the *Stone.*

The *Murrey Nectorine* is of a yellowish colour, and not so good as the *Roman.*

The *Tawny Nectorine* is an excellent *fruit*, being red on the out-side, and yellow within.

The *Russet Nectorine* is of a Brown Russet colour on the out-side, and red at the *Stone.*

The *Orbine Nectorine* is a well tasted *fruit*, being red on the out-side.

All these aforesaid *Nectorines* and *Peaches* are treated of by *Rea, fol.* 210, and 212.

Peaches and *Nectorines* are more tender than *Apricocks*, and the *fruit* requires more the *Sun* to ripen them; so that they must be Planted on the hotest *Walk*, that is, such that hath the most influence of the *Sun.*

If you suffer the middle Stem to grow upright, the side *Branches* will not prosper, but decay for want of Nourishment, the top drawing away the Sap. Therefore when the Tree is young bow down the Head, and so Nail it to the *Wall*, which will stop the Sap and cause the *Tree* to put forth side *Branches.*

Such *Trees* that are old, and decaying, cut down in *March* as low as convenience will allow, leaving some *Branches* to draw up the Sap, and cover the Wound with Clay; and the *Stock* will put forth new *Lances*, and in a Year or two come to bear *fruit* again very plentifully.

Of VINES, and the several sorts of GRAPES.

THe small *Black Grape* is first ripe, 'tis a well-tasted Fruit, and set thick on the *Bunches.*

The *White Muscadine Grape* beareth large Bunches of great *Grapes*, both of a sweet and pleasant tast. Of this *Grape* there are two sorts; of which one more sweet and pleasant than the other.

The *Canada Grape*, or *Parsley Vine*, so called as having its *Leaves* much like those of *Parsley*; it is a *White Grape*, thinly set on Bunches, and late ripe.

The *Blood-Red Grape* is very good for our Clime. Of which there are several sorts; *viz.* the sweet *Alicant* or *Spanish Tint Grape*, the great black *Orleance*, which is a very harsh and restringent *Grape*; which is usually mixt with the *White Grape*, to give its colour for the rough *Claret.*

The *Red Muscadine* requires much *Sun*, and is a large *Grape.*

The *Raysin* of the *Sun Grape* requirs also much *Sun*, and when ripe, is a Red, large, and good tasted Fruit, but hath little Juice, being very fleshy; it is excellent to preserve and pickle.

The *Bursarobe Grape* requires also very much *Sun*, otherwise it will not ripen with us: It is an excellent large white and well tasted *Grape.*

The *Frontiniack* is a white Musky sweet *Grape*, and requires so much *Sun* with us, that it seldome comes to perfection. There is also the *Red Frontiniack* which is much of the nature of the white.

The *Muscat Grapes* are very good, and great bearers, but require so much *Sun* that they ripen very late.

The *Burlet* is a very large White *Grape*, chiefly fit for *Vinegar*, as seldome being here ripe.

There are divers other sorts of *Grapes* found in *France*, *Italy*, and other *Countreys*, which are not fit for our *Climate*; as indeed many of these aforesaid, so that 'tis unnecessary to repeat their Names.

Vines prosper best in a dry, gravelly, or stony Ground; the wet, stiff or clayish Soyl being not agreable to their natures; but the sandy light *Soyl* is the best. They affect much *Sun*, and delight to be sheltered from the cold Winds. Every Winter the *Roots* should be opened, and *Ashes* or good rotten *Dung*, put thereto, being well mixt with the Earth. From *Christmass* to the end of *February* is the Season to prune the *Vines*, as before directed; but not until they have had two Years growth. About the end of *August* clear the *Vines* from those Superfluous *Leaves* and *Branches* that obstruct the ripening of the *Grapes.*

Vines are easily encreased by laying the new *Branches* in the Earth, or by *Cuttings*, which within a Year or two will be fit to transplant, as occasion requires; and whilst they stand unremoved, they must be yearly pruned, as the *Vines.*

Thus

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Thus much may suffice concerning the planting of *Vines* about your House and Walls. It will not be amiss, since I am entred on this Fruit, to lay down some Rules for the ordering a *Vineyard*. And the rather for that it is now coming into fashion amongst the curious of our *Gentrey*; All which I shall set down, as received from the hands of that Honourable, worthy, and truly experienced Person in these, and the like affairs, *Charles Howard* Esquire, Brother to the late Duke of *Norfolk*.

First, You must be provided with a dry piece of Ground, of a Chalky bottom, covered with a light Mould on the Top, but a fat sandy Soyl is best; which should be on the side of a Hill, exposed to the South *Sun*. Let the Ground be well digged, broken small, and cleared from Weeds in the *Summer* before *Michaelmas*; then from *November* to *March*, when the Weather is fair and open, plant your rooted *Vines* of a years Root in streight Rows, at about a Yard asunder, and very shallow; yet so that the Roots be covered. The first Summer do not prune them; but let them grow, only keep them clean from *Weeds*, and set Stakes close to each Root about a *foot* high, to which fasten the strongest *shoot*, and let the other *branches* fall down as they will. In *April*, or the begining of *May* following, just as they begin to bud forth their *Leaves*, bow the top of each *Vine* archwise to the next Stalk, and there fasten it, and from this bowed *Branch* will come out new Shoots, which will produce *Grapes* that will hang down to the Earth, which will be the sweetest. And this is all that is done to them until pruning time, which is from the end of *January* till *March*; and then cut away the *Branch* that was tied the last year to the *Stalk*, and arched down as low as an Eye, but one or two at the most, and tie up another of the strongest *Branches* for the Stock, instead of the former, pruning away all the other *Branches* within an Eye or two of their Bottoms; for the fewer *Branches* you leave to the Root, the more *Grapes* you shall have the following Year.

Every Year the Ground in your *Vineyard* must be well diged, but not very deep, and cast the fresh Mould in the Paths to the Roots of the *Vines*, laying all plain and even and free from *Weeds*: Also in *Summer* you must *Hoe* up the *Weeds*, for the barer the Earth is kept in the Alleys, it is the better; but about the *Roots* the *Earth* must not be stirred in *Summer*, nor in the bearing time; but the elder the *Vineyard* is, the deeper it should be diged, and turned up yearly, and old rotten *Dung* or *Ashes* should yearly in *February* or *March* be mixt with the *Mould*; but use not too great a quantity of *Dung*.

The best kinds of *Vines* to be planted in our *Clime* for a *Vineyard*, are the white and red *Muscadine*, and the *Frontiniack*.

When your *Vines* begin to decay through age, plant Young ones in their rooms; but they will continue a great while before Age decays them.

Keep the *Vine-stocks* about a Foot high, from whence let the *Shoots* yearly come forth, pruning all the *Branches*, except one or two of the strongest, within an Eye or two of the head of the old Stock; but prune not close to the *Stock*, except such *Branches* that you would have to shoot again; for too many Shoots from a *Stock* will hurt the *Root*; therefore leave but a few; and the best Cuttings are from a Branch that spreads most in the midst of the *Tree*, and not from the lowest or highest *Branch*, having five or six Joynts from the old *Stock*.

Of the FIG-TREE.

The *Fig-Tree* is of several sorts, and all most fit to be planted against the *Wall*, where they may have the benefit of the *Sun*. These following are the chief sorts.

The *great blew Fig*; The *Dwarf blew Fig*; The *flowering Fig*; the *white dwarf Fig*; the *Languedock Fig*, and the *Marcelles Fig*; of all which the great blew *Fig* is most fit for our Clymate, and is easily encreased from *Suckers* and by *Layers*.

Of the SERVICE TREE.

The common *Service-Tree* grows wild in many places; but there is a kind like the *Hors-Chesnut*, common in *France*, whose Fruit is much larger and better than the common sort. They are raised from the *Berries* which must be sown as *Haws* in *Beds*; they are also encreased by *Suckers* or *Sets*.

Of the MULBERY-TREE.

This *Tree* is of several Sorts; the *Fruit* or *Berries* being of three colours, *viz. black*, *white* and *red*.

The *Black* groweth to a large well Spread *Tree*, whose *Fruit* at first is green, and when ripe, is *black*.

The *White Mulbery* groweth not so large, is thiner set with *Branches*, and the *Fruit* is smaller, and of a sweet taste.

The *Virginian Mulbery* groweth to a large *Tree*, the *Fruit* is long and red, and of a pleasant taste.

The CORNELIAN CHERY TREE.

This *Tree* hath its *Flowers*, or *Blossoms* small, yellow, and comes early, but the *Fruit* is late ripe being shaped like a small *Olive*; and for colour some are of a shining red, others yellow, with red *Sides*, and some almost white. The *Fruit* is chiefly used *Phisically*, being preserved.

The BARBERY-TREE.

This is a common *Tree*, but there are two sorts something rare; the first hath many *Branches* of *Berries* that are without Stones, and some on the same Bush with *Stones*. The other differs from the common, in that the *Berries* are as large again, and far better for preserving. These *Plants*, are exceeding great encreasers from the *Suckers*. The

The MEDLER TREE.

This *Fruit* is of no great Esteem, and would be less did it not come when all others are gone. There are said to be in *France*, *Medlers* without *Stones*; and had we this sort, it would be of some Esteem.

The FILBEARD TREE.

This *Tree* is well received amongst all; there are three sorts, more rare than the common known amongst us, *viz.*

The *White Filbeard* is the most common.

The *Red Filbeard* also common.

The *Filbeard* of *Constantinople*, which is much like the White, but hath its *Kernel* larger and better.

The NUT TREE.

The great round *Nut* which is thicker shelled and bigger than any other sort, the *Kernel* being as big as other *Nuts*, with their Shells on.

The great long *Soft-shell'd Nut* hath its *Kernel* as big as an *Almond*, and very well tasted.

All these sorts of *Nuts* and *Filbeards* are plentifully raised from *Suckers*, as well as sown of the *Nuts*.

Goosberry Trees.

These are common in all *Gardens*, and easily encreased from *Suckers*; the best sorts are the Yellow and White *Dutch Amber*. There is a sort which is a small *Red Berry*, of no great Esteem, but the large preserving *Goosberry* is of Esteem.

Curran Trees.

These like *Goosberrys* are common, and easily encreased from *Suckers*; the best sorts are the large *Red* and *White*. There is also a *Black* sort, which as yet is something rare, and indeed is like so to continue, as not being much received, only for a curiosity more than for use, as the others are, which makes excellent *Wine*, if well ordered, being of a very strong body, and lasting.

Having treated of the several sorts of *Fruits*, in the next *Chapter* I shall apply them to use; laying down some Directions for the making *Wines*, *Cyder*, *Perry*, &c.

CHAP. X.

Of the use and benefit of Fruits for the making of WINES, CYDER, PERRY, MEAD; &c.

The Planting of *Fruit Trees* is without doubt one of the greatest Improvements that can be made of the most part of our Ground, the *Fruit* serving both for Meat and Drink, especially *Apples* for the making *Cyder*, which if well prepared, and rightly made of *Cyder Fruits*, is a most delicate Liquor, not much inferiour to *Wine*, and is more agreeable to the Constitutions of the *English Bodies*.

CYDER next to *Wine* may justly claim the preheminence of other Liquors. There are divers ways used for the making it, and sundry sorts of *Fruits* of which it is made.

The *Fruits* most fit for this Drink may be comprehended under two sorts, or kinds, *viz.* either curious *Table Fruits*, as *Pippins*, *Pearmains*, *Codlins*, and the like, or the wild, harsh, and common *Apples* fit only for *Cyder*, as the *Red-Streak*, the *White Must*, the *Green Must*, the *Gennet-Moyl*, *Hoits*, *Summer-Fillet*, *Winter-Fillet*, *Stocken Apple* &c. The greater part of which are so harsh and unsavory, that *Swine* will scarce eat them, yet affords an excellent tart and winy Liquor, far exceeding the *Pippin* and *Pearmain*; and are also of so strong a Body that the *Cyder* will keep, being well preserved, seven Years.

But there are some that prefer the *Pippin*, *Pearmain*, and the like curious *Table Fruit*, to make the best *Cyder*, as having in them a more Cordial and Pleasant Juice, than the harsh *Apples*.

By observation it is found, that the more Red is in the Rind of an *Apple*, the better it is for *Cyder*, and the Paler the worse; and no sweet *Apple* that hath a tough Rind, is bad for *Cyder*.

For the making of *Cyder* let your *Apples* hang on the *Trees* until they be throughly ripe, gather them without *Bruises*, and before you make *Cyder* of them, lay them in heaps in convenient places, free from *Rain*, or *Dew*, where they may sweat for about a Fortnight, and the harsher and more solid the *Fruit* is, the longer they may ly. This Sweating takes forth their *Aqueous* Humidity which is injurious to the *Cyder*.

Such *Fruit* that are *Unripe*, *Wind-falls*, or any ways injured or bruised, divide from the sound, for it is better to have two sorts, the one excellent, and the other indifferent, than both ordinary. And be sure to take away all the *Stalks*, *Leaves* and Rotten *Apples* from either sort; for the *Stalks*, and *Leaves* will cause an ill Taste, and the Rotten *Apples* make it deadish.

About twenty four, or twenty five *Bushels* of good *Cyder Apples* thus sweated will make a *Hogshead* of *Cyder*, and if taken from the *Tree*, about twentytwo *Bushels*.

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These *Apples* thus prepared, may be either ground in a *Horse Mill*, like as *Tanners* grind their *Bark*, or else beaten in a *Trough* with Beaters of Wood rather than Stone; and the more they are *ground*, or beaten, the better; but the *Grinding* is perferred before the Beating them.

After the Grinding, the Pulp should be put into a hair *Bagg*, or *Baggs*, and so put to the *Press*, of which there are several sorts, but the *Screw-Press* is esteemed the best.

Being *Prest*, strain it, and put it into your Vessel, which must be so placed that it may stand to ferment, allowing but a small *Vent-hole* that the Spirits wast not; fill not the Vessel quite until it hath done working; then fill it of the same sort, which must be kept for that purpose, and stop it well, only with caution at the first, lest it break the Vessel.

The best Vessels for the *Tunning* up the *Cyder* and to preserve it, are these; the *Barrel-Bords* strait, the Vessel broader at the one end than at the other, and to stand on the lesser end with the *Bung-hole* on the top; the reason is, that the drawing the *Cyder* through but slowly, the *Skin* and *Cream* contracted by its Fermentation, descends and wholly covers the *Liquor* by the tapering of the *Vessel*, and thereby preserves the Spirits of the *Cyder* to the last, which otherwise would wast and expend themselves.

Some *Cyder* will bear a mixture with Water, without injury to its preservation, and others will not; so that you ought to understand the nature of the *Fruit* before such a mixture is made; and be sure let it be done in the grinding, and not afterwards; for then it will better incorporate with the *Cyder*.

Some are of opinion, that before you press the *Cyder*, after it is ground or beaten, the *Liquor* and *Must* should ferment together in a Vat for that purpose, close covered, for about twenty-four hours, which is said much to enrich the *Liquor*.

The other sorts of *Fruits* for the making the *Cyder*, as the *Pepin*, *Pearmain*, *Gillyflower*, *Codlin*, and the like Summer or *Table-fruits*, are very good palatable *Cyder* for a Year, but will not last good longer, as wanting the strength of body that the others have.

In the Pressing, as also in the *Grinding* or Beating these *Fruits*, the same Method is used as before directed; but the *Cyder* or *Must* is not to be immediately *Tunned* up, but should stand in the *Vat* at least twenty four hours, or more, according as the *Apples* were more or less pulpy, and must be close covered with *Hair-cloths* or *Sacks*, to hinder too much evaporation of the Spirits; nor must it be kept so close in as to cause *Fermentation*, in which time the more gross part of the *Feces* will precipitate or fall to the Bottom, which otherwise would have prejudiced the *Cyder* by an over *Fermentation*, and have made it flat and sowre.

Then at a Tap, three or four *Inches* from the Bottom of the *Vat*, draw forth the *Cyder*, and *Tun* it up, wherein is yet a sufficient quantity of the *gross Lee* or *Feces* to *Fermentation*; the want of the right understanding whereof is one of the main causes of so much bad *Cyder* in this Kingdom.

PERRY.

Perry is a *Liquor* not so generally received as *Cyder*, nor indeed is it so grateful to the Palate.

The best Pears for this *Liquor* are such that are not fit to be eaten for their harshness, and therefore are commonly planted in *Hedge-Rows*, as the *Bosbury Pear*, the *Horse Pear*, the *Bareland Pear*, and the *Choak Pear*; and the redder they are the better they are.

Pears must be through ripe ere gathered; they must be laid on Heaps to sweat as the *Apples*; and for the grinding or Beating, Pressing, and *Tunning* them up, you must observe the same Rules as for *Cyder*.

Crabs and *Pears* ground together make a good *Liquor*, for the *Crabs* help to preserve the *Perry*.

Some Observations concerning Cyder and Perry.

Pearmains make but a small *Cyder* of themselves.

If the Vessel be tainted, boyl an Ounce of Pepper in Water, enough to fill the Vessel, and let it stand therein two or three days.

New Vessels give the *Cyder* or *Perry* a deep Colour, and an ill Tast; therefore *Wine-Cask* are esteemed the best: But for want of such, put a little Mustard-seed ground with some of the *Cyder* into the *Vessel*, and it will help it.

Two or three *Eggs* put into a *Hogs-head* of *Cyder* that is sharp, sometimes helps it; and two or three rotten *Apples* put into the *Cask* will clarify thick *Cyder*. Also thick *Cyder* or *Perry* by a second *Fermentation* may be made good and clear; but that which is acid is seldom recovered.

Ginger helpeth *Fermentation*, promoteth its duration, and gives a more brisk Spirit.

Boyl *Cyder* immediately after the *Press*, before *Fermentation*.

The *Cyder* that runs from the Ground, or beaten *Apples* before they are in the *Press*, are much the best.

Fill not the Vessels quite full, that there may be room for the *Cyder* to gather a *Head*.

The mildness and temperature of the Weather is of much concernment in the Fermentation of *Cyder*.

Wheaten-Bran cast in after *Fermentation*, thickens the *Coat* or *Cream*, and is a great preservation to it.

Cyder that is in danger of being spoyled, may be preserved, or recovered by putting into a *Hogs-head* about a *Gallon* of unground *Wheat*, or some *Mustard-seed* ground in about a Pint of *Cyder*, or *Sack*, which is better.

Stone *Troughs* are not good to beat or grind *Cyder* in, because they bruise the Kernels too much, which gives an ill Tast to the *Cyder*.

And

And after they are ground or beaten, let them stand a Day or two before they are prest, which will cause it to have a better Colour, and doth also cause it a little to ferment and maturate in the Pulp. Also after it is prest 'tis good to let the *Cyder* stand in a Vat covered, to ferment about twenty four Hours, before it is tunned up, and then draw it by a Tap from the Vat within about two *Inches* from the Bottom, leaving the Feces or Dregs behind, which will not be lost, if you put it upon the *Chaff*, for then it meliorates the *Pur*, or *Water Cyder*, if you make any.

Your *Cyder*, or indeed *Perry*, being *Tunned* up, leave a small Vent open for some Days, until its windy Spirit is spent, which otherwise will break the *Barrel*, or find some other Vent that will always abide open, to the spoyling of the *Cyder*, if you find it not out and stop it.

If *Cyder* or *Perry* proves thick and sowrish, put into the *Cask* at the Bung-hole some *Apples*, which will cause a new Fermentation, and very much quicken the *Cyder*, provided you draw it off into another *Vessel* within a few Days after. But if it be only a little sowrish, or drawn off in another Vessel, the way to correct or preserve it, is to put about a *Gallon* of Blanched-Wheat into a *Hogshead*, and so according to that proportion into a greater or lesser Vessel.

Mixture of *Fruits* makes good *Cyder* or *Perry*, provided they be of an equal ripeness, and well picked from rotten ones, as also from Leaves, Stalks, or the like.

The best way to preserve *Cyder* long, is to Bottle it; in doing which observe these Directions; You may Bottle it in two or three Days after it is well settled, and before it hath throughly fermented; or you may Bottle it in *March* following, which by the curious is adjudged the best time. After it has been botled a Week, provided it be new, put into each Bottle a Piece of fine Loaf-Sugar, as big as a Nutmeg, which will make it brisk; but if you Bottle it not till *March*, then you may put in the Sugar at the time of the Botling. Your great care is required in the well Corking them, for if they take vent your *Cyder* or *Perry* (and indeed any sort of Liquor whatsoever) will be dead, and by consequence spoyled. Therefore chuse your soft spungy Corks, that will swell, and to prevent their flying tye them about the Neck of the Bottle with Pack-thread.

In *Summer* you may keep them in cold *Fountains*, or in your *Cellars* covered over with Sand, and in *Winter* to prevent their breaking with the Frost, cover them with Straw, and by this good ordering them you may keep them many Years, provided the *Fruit* be good, and of a strong Body.

Of Wines made of the Juice of Fruits.

Cherries make a fine, cool and pleasant Drink for the Summer Season, but being of no strong Body, will not keep long; yet the *Morello Cherry* will keep, and for *Brandy* this doth far exceed the *Black Cherry*, being of a curious Tast and a great *Cordial*; for the making this *Wine* gather such *Cherries* that are ripe, and not rotten or bruised, and press them in a Hair Cloth as your *Apples*, or *Pears*, after their grinding or Beating. Let the Liquor stand in the Vat to settle, and then draw it off into Bottles, which must be ordered as for *Cyder* and *Perry*, and well stopt with good Corks.

PLUMS make a good *Wine*, but not so brisk and fine as the *Cherries*; the *Black Pear-Plum* is the best.

MULBERRIES make a rich, and high coloured *Wine*, and of a strong Body; It is very good to put to small or pale *Wines* to add a *Tincture*.

RARSBERRIES is an excellent pleasant *Wine*; and if mixt with other Liquors, adds an excellent high Flavour and Gust unto them. The usual way to make this *Wine*, is to boyl up the Juice with Sugar, and put it up in Bottles. Of this Juice two or three Spoonfuls are sufficient, to put into a Bottle of Claret, which will give it the Gust of *Rarsberry Wine*.

GOOSBERRIES extracted in their due time, being neither too ripe nor too green, and mixt with Water and Sugar, make a palatable *Wine*; it is usually made without boyling, because that contracts a brown Colour, and Water is added to it, to mitigate the strength. After prepare it thus; Let the *Goosberries* be bruised, but not too much, which force from the Pulp through a Hair-cloth: The Juice that comes out put into an Earthen Pot, the which let stand for four or five days to settle, then draw it clear off into Bottles, putting to each Bottle two Ounces of fine Sugar, and so Bottle it up.

CURRANS are also a strong *Wine*; It is to be mixt with some Water and Sugar, and is best to be boyled; when it is well settled, let it be put up into Bottles; and well Corked.

QUINCES make a strong and excellent *Wine*, which is thus made; Slice them, then press them in a Hair-cloth; the Juice must stand in a Vat, or Vessel, to settle as the other Liquors, before it is Botled up. If Sugar, and some Aromatick Spices were put in, it would much add to the pleasantness of the Tast.

MEAD or *METHEGLIN* being rightly ordered, is an excellent Liquor, the pureness and whiteness of the Honey is the chief cause of its clearness. It is made several ways.

I shall give you Instructions for the making it two or three ways, which are adjudged the best.

Take one part of Clarified *Honey*, and eight parts of pure clear running or Spring Water (but for weak Mead a far less quantity of Honey,) boyl them well together in a Copper or other Vessel, untill good part be consumed; then take it off the Fire, and when it is almost cold Tun it up, and it will work of it self; Then so soon as it has done working, stop up the Vessel very close, and if you have conveniency, bury it under Ground for about two Months; if not, keep it in a low place, and this will take away the tast and smell of the Honey and Wax, and give it a Flavour like *Wine*.

If you would have it of an Aromatick Tast, to about 12 *Gallons* you may add these Ingredients, *viz.* Flowers of *Rosemary*, and *Marjoram*, of each a small Handful; a Handful of Mother

of

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of Thime,one Ounce of Nutmegs and Cloves, ½ an Ounce of *Cinamon*, and of *Ginger*, and *Cardamum* of each two Drams; slice the *Nutmegs*, and *Ginger*, and bruise the *Cloves*.

Another way is, To twelve *Gallons* of scum'd *Must* or Liquor, as aforesaid, take one Ounce of *Ginger*, ½ Ounce of *Cinamon*, of *Cloves*, and *Pepper* of each two Drams; let all these be grosly beaten, the one half sowed in a Bag, and the other loose; and let them boyl in the *Liquor* about half an Hour.

Some mix their Honey and Water until it will bear an *Egg*, by which rule you may make it stronger or weaker at your pleasure.

Another way is, To sixteen *Gallons* of *Must* take one Ounce of Thime, one Ounce of *Eglantine*, ½ an Ounce of *Margerom*, and as much of *Rosemary*; 2 Ounces of *Ginger*, one Ounce of *Cinamon*, and of *Cloves* and *Pepper* of each ½ an Ounce, all grosly beaten; of these Ingredients let the one half be boyled in a Bag, and the other loose, as aforesaid.

Another way, To about eight *Gallons* of Water, and one *Gallon* of Honey, as aforesaid, add three or four li. of *Realons* of the *Sun*, stoned, without any other Ingredients or Spices.

Note that all Green Herbs are apt to make the *Metheglin* or *Mead* flat or dead, and the *Cloves* make it high coloured. The scumming it in the boyling is injurious, for that being of the nature of Yest, helps it to Ferment and purify; but tis customary with most to take off the Scum in the boyling, and for setting it to work, to use Yest, which is not so good.

CHAP. XI.

Of the Benefit by Raising and planting of Timber-Trees, and other Trees useful for Building, Fewel, and other Mechanick Uses.

MAny and considerable are the advantages by *Wood* and *Trees*, for 'tis experimentally known that an *Acre* of Mountainous and barren Ground not worth cultivating, being planted with *Trees*, and *Coppices*, will be worth an *Acre* of indifferent good Ground well Husbanded; Also it improves and meliorates Ground, if cleared and ploughed: And *Trees* being planted in *Hedg-rows* are very commodious to keep off cold Winter Blasts that nip the *Corn*, and pinch the Cattle; and also qualifie the dry Winds and parching Heat of the *Summer*. It also affords Timber for the building and reedifying of Houses, and Out-houses; as also for the making of Carts, Ploughs, and other Utensils, together with a supply of Fewel, so deficient in many *Champain Countreys*.

And besides these, and many more Advantages, nothing can render a Seat more delectable than when situate amongst pleasant *Trees* and *Groves*, without which it lieth unpleasant, and naked, as being exposed to the Winds, and Weather.

There are several Sorts of *Trees*, very useful and profitable, as well as ornamental; most of which I shall treat of: And first with *Timber-Trees*.

TIMBER-TREES.

THe *Trees* reckoned for *Timber* are the *Oak*, the *Elm*, *Ash*, *Beech*, *Walnut*, and *Chesnut*.

The *Oak* hath the preheminence of all others, for its strength and Durableness; and for that reason is made use of for building of *Ships*, for which the *English Oak* excels all other Nations. It is a *Tree* that will grow and prosper in any sort of Land, either good or bad, as on Clayey, Sandy, or Gravelly Ground, whether dry or moist, warm or cold; but that which is most agreable, is the black, deep and fast Mold, and rather dry, and on a rising Ground, than low and moist. They will also grow on hilly and stony Ground, though but slowly.

For the Propagation you may sow *Acorns* in *Beds* well dug and prepared; the Season for which is soon after they are full ripe; for they must not lye long after they are gathered, for the withering Spoyls them. The Spring following they will come up and be fit to transplant into your Nursery at convenient Distances, until they are fit to plant into your Grounds: But it is, and hath been the common Opinion, especially amongst the Countrey People, whose Custom is to follow their Predecessors Foot-steps, right or wrong that the *Oak* of all other *Trees* will not grow, if set; but 'tis a vulgar Error, for they will grow and thrive as well as any other sorts of *Trees*, as hath experimentally been found, not only by those raised from the *Acorn*, as aforesaid, but also by Sets drawn up in *Hedg-rows*, or other places, and transplanted; but these prove generally crooked, so that you should cut off the Shoot close to the Ground when you plant it, and in the place thereof will shoot up another that will grow streight.

Besides the great benefit by the *Wood* for Buildings, Pails, Rayls, Mills, Sluces, &c. enduring both wet and dry, Wind and all Weathers, it is of such use, that *Tanners* cannot dress their *Leather* without the *Bark*; likewise the *Mast*, that is, the *Acorns*, are of great advantage for the fatning of *Swine*, and that *Bacon* so fed (especially if they are fed with *Pease* some time after) is of a delicate sweet Tast; and if salted with *Salt-Peter* instead of *Bay-Salt*, will be little inferior to the *Westphalia Bacon*, so highly esteemed. *Acorns* are also very good feed for *Rabets*.

The *Elm* is a *Tree* easily propagated, growing in most sorts of Ground; but it most delights in light, loose, and moist Land, and on the Banks of such level, and fertile Grounds, whether gravelly or chalky, it prospers well.

This

This *Tree* is raised from *Suckers*, which shoot from the *Roots* in great plenty, which may be slipped off, and transplanted; or if the *Roots* of an *Elm*, that is felled, be cut into pieces, and put into Earth, they will send forth Suckers.

It is a *Tree* very fit for *Avenues*, or *Walks*, by reason of its growing so streight, upright and high, over-topping all others, as also so near together; and is of that flexibleness that it may be brought to grow in any Shape.

If it is felled between *November* and *February*, it will be all heart, or Spine, having little or no Sap; and is of great use for making all things that lie always wet, or always dry.

The *ASH* is a quick growing *Tree*, thriving in any sort of barren, montainous and dry Ground, but not so well for *Timber*, as in *Coppice-Woods*, nor will it thrive so well as on good Ground, or such that is of a chalky, and white Soyl.

'Tis raised from the *Seed*, or *Keys*, which must be gathered when they begin to fall about *October*, and so sown in *Beds*, as you do your *Acorns* or *Haws*, and the next Spring come Twelve-Month they will appear, and thrive very well; but they must be removed, and set thinner whilst they are small, by reason of their speedy deep rooting. You must not cut off the Tops of the young small *Ashes*, by reason it is a sappy Plant; but for the greater *Sets* it is good to cut them near the Ground, for then they will send forth new Shoots that will be better and larger. You may also have Plants drawn by those that draw Quick-setts, which will prove very good; but not like unto those that are raised in a Nursery, as aforesaid.

If you would raise these *Trees* on *Hills* or open Grounds, the best way is to sow the Seeds in the place, either before, or after the *Plough*; and if in *Coppices*, or in such places where the *Plough* cannot pass, then to prick in amongst the *Ridges* of *Hasel*, or the like shruby stuff, which will defend it from *Cattle* until the *Trees* are grown up.

The Season for setting the *Ash* for use, is from *November* to *February*; for if the Sap be but a little in the *Tree* the *Worm* takes it, and soon Spoils the *Wood*.

The *Ash* is a speedy grower, and is of general use for *Carpenters*, *Joyners*, *Wheelrights*, *Coopers*, *Turners*, and other *Artificers*, and is also much used by *Gardiners* for *Arbours*, *Palisado-Hedges*, *Hop-poles*, &c. and for firing no Wood is comparable to it, either green or dry.

The *BEECH* delights to grow in gravelly, stony, sandy and warm Ground, and on the sides and Tops of high *Hills*, and chalky *Mountains*.

This *Tree* will grow to a great bigness, and is raised from the *Mast*, as the *Oak*; as also from young Plants drawn up, and Planted as before directed; for the *Oak*, whilst it is very young it grows but slowly, but when it is gotten out of the way, no *Tree* thrives better; and although it be crooked, knotty and ill shapen, whilst it is young, yet it will be otherwise when it comes to its full growth.

It is a Wood of a fine, clean and white *Grain*, and not apt to split or rend, which occasions it to be so much used by *Turners*, *Joyners*, *Upholsterers*, and the like *Handy-crafts*. The *Mast* is very good and sweet Feed for *Swine*, *Deer*, *Pheasants*, &c.

The *WALNUT-TREE* is a Wood of a fine Grain, and of a curious brown Colour, being of excellent use for curious *Works*, and therefore much used by the *Cabinet-makers*, *Gun-smiths*, and such like *Artificers*. It delights in a good deep Mould, and is raised from the *Nut*, as before directed in the Chapter of *Fruit-trees*.

The *CHESNUT* delights in a light Ground, or in a moist Gravel, but will grow in any Soyl; It is also raised by the *Nut* as the *Wal-nut*: it is a durable Wood for Building, and its *Fruit* is good for the *Table*, especially roasted in the Embers; and is esteemed excellent for the Fatning of *Swine*.

Of Trees for Fewel, and other uses.

THe *BIRCH* is a *Tree* that will grow and thrive in any place, as well on the hot Gravelly and sandy Ground, as on the cold, wet, and moorish. Tis raised from Suckers, planted at convenient distances, five or six *Foot* asunder, which soon will grow up to *Trees*. After the first Year they should be cut within an *Inch* of the Ground, which will cause them to shoot out the stronger.

The Wood is useful for *Turners*, and makes good Charcoal.

This *Tree* yields the best Sap, and most in quantity of any in the Kingdom, which being prepared, either with *Sugar* or *Honey*, makes a pleasant Liquor, which now bears the name of *Birch-Wine*. It is thus to be drawn from the *Trees*; Cut off some of the small Branches, and hang Bottles with the ends of the Branches so cut put into their months, into which the Clarified sap Liquor will distil. You may also bore a Hole into the Body of the *Tree*, putting therein a Tap, to which hang a Bottle to receive the said Liquor. And by either of these ways good quantities thereof may be extracted in the Months of *February* and *March* when the Sap ascends, and before the Spring of the Leaf. It will run best when the Sun shines warm, or when the Wind is South, or West. This *Liquor* thus extracted, and well prepared, makes a very good and palateable *Wine*.

The *MAPLE* delights most in a sound and dry Soyl, either in Woods or Hedgrows. It is raised from the *Keys*, as the *Ash*. The Wood is very good for *Turners* and *Joyners*, being of a fine, light, and white Grain.

The *QUICK-BEAM* delights in a light Ground, in Mountains and Woods. 'Tis a quick growing Wood, of chief use for Fewel, and is raised from the Setts; or the Berrys, which when ripe, may be sown.

The *HORN-BEAM* agrees best with Barren, cold and hilly Grounds; 'tis to be raised by Sets, which when set, must be cut within halfa *Foot* of the Ground, and from the Seds sown

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in *October*, which are ripe in *August*. It is a very hard Wood, and fit for *Mill-wrights*. If planted at about a *Foot* or eighteen *Inches* asunder in a single Row, it makes a fine Hedge, for it grows tall, with Leaves to the Foot of the Stems.

The *HASEL* groweth in any kind of Ground, and chiefly in *Coppices*; tis raised from the *Nut*, or from Sets, as the *Filbeard*, and is of principal use for Fewel.

Of Aquaticks, or Trees growing in watery places.

The *POPLAR* thrives best on the Banks of Rivers, or Ditches, but not in the Water, as the *Willow*; 'Tis raised from the Branches cut off, and thrust into the Ground; but cut not off the Top, until they have stood two or three Years, and then they may be headed at eight, ten, fifteen, or twenty *Foot* high; or you may let them run up without topping, which is more ornamental, but not so profitable. They may be planted at three or four *Foot* asunder, and will grow very well.

The Wood is good for *Turners*, as well as for Fewel, being very profitable, and a great grower.

The *ASPEN TREE* little differs from the *Poplar*; only it will grow in dry places, and not in wet; it is raised by Suckers, and must be ordered as the *Poplar*, not cutting off the Head, the first or second Year.

The *ABELE TREE* is a kind of white *Poplar*, but of a finer Grain, 'tis raised of Slips from the Roots, as also from Layers, and Cuttings; 'tis a speedy grower, and therefore very profitable to Plant.

The *WILLOW* delights in wet and moorish Grounds, being commonly set on the Sides of Ditches, or Rivers to receive the benefit of the Water to nourish them. They are raised of Sets, or Lopings, the greatest care being to choose those that are smooth, and of a fine green, which shews them to be kindly, and free from the *Canker*. They are to be cut Taperwise, at the lower part, which is to be thrust into the Ground, a deep Hole being made in the Ground by an *Iron Crow*, and the Set being thrust down therein, great care must be that the Earth is well closed about it, otherwise it will not draw root so well; and also be careful that you raise not the Bark, or Rind, from the Wood. Your Sets being thus ordered, let them be bushit about to be preserved from the rubing of *Cattle*, to loosen them for two or three Years, and afterwards they are past all danger: You must also keep them clean from Suckers, which draw away the Sap that should ascend to the Branches for their nourishment, and at four or five Years of Age the Heads should be Lopped, which will make them grow the better.

The *Willow* is of great profit, and useful for divers occasions, besides for Fewel; so that 'tis observed that a *Willow will buy a Horse, before an Oak will buy a Saddle.*

The *WITHY* is a larg *Tree*, and should be planted on high Banks, by reason their Roots run very deep in the Earth.

The *SALLY* is a very quick grower, and delights in Moorish Grounds, as the *Willow*.

The *OSIER* requires constant Moisture, and therefore must be planted in such places that are subject to frequent overflowings. They are raised from the Shoots or Sets that should be cut about *February*, and thrust into the Ground, much after the way as the *Willow-Sets*. They are very profitable and used by *Basket-makers, Gardiners*, &c. an *Acre* being esteemed to be worth as much as an *Acre* of *Wheat*.

Of TREES for FENCING.

Fencing and enclosing of Ground being of such great benefit as already hath been discoursed, it will be necessary to treat of such *Trees* as are requisite for the same, with Directions how to raise, and order them; and first of the *White-Thorn*.

The *WHITE THORN* is esteemed the best for Fencing, being a strong and durable Hedge; 'tis to be raised from Plants, or by sowing the Haws in Beds dug and prepared, as before directed, and from thence (when sprung up) to be Transplanted, which is the surest and best way; for the *Garden-Quick* (being that which is sowen) is esteemed far before the Plants drawn up in Hedg-rows and Fields, and will thrive much better, as being young and not stunted. The best way to set your Quick sets is on the flat, the Ground being well dug and finely ordered, and let the Bordure consist of three *Rows*, and your Sets planted at about nine *Inches* distance, which will make a stout Hedge; If you are not well stored with Quick sets, two Rows may serve. Be sure to keep the Bordure clean weeded, and hoed, which is a great furtherance to their growing; otherwise they will be choaked up. After two Seasons you may cut them, which will cause them to shoot out the better, and thicker; and if the Season is dry, forget not to water them, which is a great preserver. And lastly provision, must be made to preserve them from the Injuries of *Cattle*, by raising Fences on each side, if it so requires. The common way to plant Quick is on the Bank, and a Hedge on the Top, which is not so good, for these reasons; First, being on the dry Bank the Sun hath more power, and so siccitates the Earth, that there is not that Moisture to nourish the Quick, as that planted on the Flat. Secondly, The Bank being shelving, that Rain in the Summer Season that should refresh it, falleth away into the Ditch; and Thirdly, In the Winter Season, which generally is wet, the Drippings that fall from the Hedge planted on the Top of the Bank, do kill it; And these are the Reasons why there is so many Gawls in those Hedges, which are not to be seen in those planted on the Flat.

The *BLACK THORN* is a good Fence, and raised as the *White-Thorn*.

The *HOLLY*, for sight, ornament and defence,

fence, is by many preferred before the *White-Thorn*, being always green, and so thick that it is not to be seen through; the only fault is, 'tis very slow in growing. It is raised of the *Berries*, and of *Sets*, as the *White-Thorn*; but the *Sets* are more difficult to grow, unless they are planted late in the *Spring*, and well watered.

The *PYRACANTHA* is an excellent Fence, having strong prickly Branches, and the Leaves are always green. It is quick of growth, and easie to be raised, either from the bright *Coralline-Berries*, which hang most part of the Winter on the *Trees*, or from *Suckers* or *Slips*. The *Berries* lye in the Ground as long as those of the *White Thorn*.

The *ELDER* makes a good Fence for a Shelter, but not for Security, as not being so thick: the *Cuttings* set will grow, being kept watered.

The *FURZES*, called *Devonshire Furzes*, make a stout Fence, and so strong, that nothing can enter it. The best way for raising this Fence, is to dig the Ground where you intend your Fence, and sow the Seed in Rows, made with a *Rill-Plough*, or with a *Hoe*; three or four Rows are sufficient. This will grow upon a dry Bank, and be far better than any dead *Hedge*.

If you have any barren Ground, not worth Plowing and Sowing, it is good Improvement to Plow and Sow it with *Furz-seed* for Fewelling, as for *Brewing, Baking*, or the like uses.

All these sorts of *Hedges* are to be ordered and kept, as before directed for the *White-Thorn*.

Of Trees for Ornament of Gardens, Avenues, Parks, and the like.

The *LIME* is of all *Trees* the most beautiful for *Walks*, and most uniform both as to its height and spreading Branches; and if set near together, affords a pleasant dark Shade; Its *Blossoms* in *June* and *July* are very fragrant and pleasing to the Scent.

It delights in a good rich and deep Soil: 'Tis raised from *Seeds* or *Berries* that drop from the *Trees* in *Autumn*, as also from *Suckers*, as the *Elm-Tree* is.

For the greater Ornament they are Cut or Headed at about eight Foot high, that thereby all the *Trees* may be of an equal Height; but if suffered to mount up without checking, they will become very tall in a short time, being quick growers.

The *SYCAMORE* is a *Tree* that delights in any indifferent or light Ground, but rather in a moist than dry. It is raised of the *Keys*, and sown in *Autumn*, when they fall from the *Trees*, which will come up the next *Spring*, being of a speedy growth. Also *Sets* cut from the *Trees* will grow, if set in moist Ground, and kept watered.

The *FIR, PINE, PINASTER*, and *PITCH-TREE*, delights in cold, high, and rocky Mountains; but Ground that is hot, dry, and sandy, is not good; they are raised of the *Kernels* taken out of the Clogs, which being laid in Water some Days, and then laid before some gentle Fire, will open so that you may get out the *Seeds*, which must be sown in *Beds*, as before directed for other sorts.

The *Firs* may be raised from *Slips*, it groweth lofty and streight; but the *Pinaster* bears the proudest and stateliest Branches, and hath a fairer and more beautiful Leaf.

Out of these Trees are made *Turpentine, Rosin, Pitch*, and *Tar*.

The *HORSE-CHESNUT* prospers well in *England*, delighting in Ground that is not too dry; the best is a rich Garden-Mould. It is a quick grower, being raised by *Layers*, and affords a pleasant sight in the *Spring*, when its *Turpentine* Buds put forth into curious Leaves, and bears a Cluster of fine *Flowers*.

The *LOCUS, LARCH*, and *PLANTANUS*, are not in much esteem amongst us; but afford an excellent Shade.

The *CYPRESS* is a curious *Tree*, and delights most in a warm and dry Ground. It is raised from the *Seed*, sown in *March*, and well endures removing, and may be brought to grow in any fashion, either *Pyramidal*, which is the usual way, or in *Hedges* kept clipt.

The *CÆDAR* is a *Tree* not common amongst us, but grows in great plenty in *America*. It is raised of the *Seeds*, and may grow in our Climate, being a beautiful *Tree*.

The *EUGH-TREE* is an Ever-green, most commonly growing in *Church-yards*. 'Tis raised from the *Seeds* sown in *Beds*, which will not come up till the second Year. It is also raised of *Suckers* or *Plants*, but is difficult to grow. The Wood is very hard, and fit for divers curious Works.

The *BAY-TREE* delights to grow best in the Shade, like unto the *Laurel*; yet it will grow in most Places and Soils. It is raised from *Seeds, Suckers, Sets*, or *Layers*, as the *Laurel*.

The *PRIVET* hath been formerly more used than at present for *Hedges* between Walks, as also for *Arbors*, being an Ever-green.

The *PHILLYREA* is a beautiful Plant, always in its Verdure, and now much used in *Hedges, Arbors*, or the like, instead of *Privet*: It delights in a warm fertil Soyl; 'tis a very quick grower, and may be raised of the *Seeds* or *Berries*, sown in the *Spring*; as also of the *Slips*, set like the Slips of *Box*.

The *ALATERNUS* prospers well in this Kingdom; It is very beautiful and useful for *Hedges* and *Arbors*, being green, with an early Blossom. 'Tis raised from *Seeds*, and is a swift grower.

Certain Rules to be observed for the better raising the aforesaid Trees in way of Nursery.

Although *Trees* may be raised by *Suckers, Sets, Slips*, and the like, yet the best and surest way is from the *Seed*; for they take Root soonest,

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soonest, and thrive far faster, which is contrary to most; *Fruit-Trees*, and make the streightest and fairest *Trees*.

The best time for sowing your *Seeds* is in the *Spring*, for then neither the Coldness of the Winter, nor the *Mice* and other Vermin will prejudice them; and for the better preserving them from drying, rotting or decaying, you may put them into *Pots* or *Vessels*, with a mixture of *Earth* or *Sand* not too dry, and at the Spring you will find them sprouted, and be as forward as if sown in *Autumn*.

The *Masts*, or *Seeds* that you design to sow should be taken from good thriving *Trees*, with sound *Stocks*; also the *Seed* should be weighty, clean, and bright.

The Ground for your Nursery should be well fenced in, and sheltered from the North and East *Winds*, and of a Soyl sometling dry; for *Trees* will better thrive, being removed out of dry into moist Ground, than out of moist into dry. The Ground must be well dug, and brought to a fine mellow Mould, and clear from *Weeds*. Being thus prepared, sow your *Seeds* in small *Furrows* or *Trenches*, about five Inches deep, and about two Foot broad, with a convenient distance betwixt, for the better *weeding* and *dressing* the young *Sets*, and cover them over with Earth with a *Garden-Rake*, and let every sort of *Seed* be sown apart.

The place where you sow your *Firs*, *Cypresses*, *Pines*, and other tender *Winter-Greens*, should be sheltered from the cold Winds, and such *Seeds* should not be sown above an Inch deep, and finely covered over with sifted Mould; and for the more convenient removal of the *Pine*; you may set two or three Seeds in an Earthen Pot without a Bottom, filled with rich Mould, setting them into the Ground up to the Brims. When they grow, leave only one, which in two or three Years growth may be removed without hazard, and in time the Plant will rid it self of the *Pot*.

These young *Plants* must be carefully kept from *Weeds*, and in a dry Season water them. In the cold Winter Season you may lay over them some *Bushes* or *Furzes*, with *Straw* scattered over to preserve them from the cold *Winds*.

For the raising a *Coppice* from *Masts* or *Seeds*, let the Ground be well *Ploughed*, as if for *Corn*, and sow it with *Winter Corn*, mixt with your *Mast*, *Nuts*, *Berries*, and *Seeds* that you intend to sow; Let the Corn be reaped high, for the *Stubble* is a great preservative of the young *Shoots* in the *Winter*, and so lay it up for a *Coppice*, fencing it about that *Cattle* annoy it not.

Concerning Transplanting Trees.

THe best Season for Transplanting of *Trees*, is soon after the Fall of the *Leaf*; but they may be removed any time after in open Weather, until *February*.

Cut not off the Tops of the *Ash*, *Lyme*, *Sycamore*, and the like *Trees* that are pithy, the first Year of their removal, because the Wet will be apt to perish them; neither cut off the Heads, nor too many of the *Branches* or *Roots* of the *Firs*, *Pines*, or the like Trees, by reason of their aptness to spend their *Gum*, which is very injurious to them.

In the transplanting of the Suckers *Cions*, *Layers* or *Slips* of the *Lime*, *Elm*, *Horse-Chesnut*, *Birch* and such like *Trees* so propagated, you are to observe the same Season, and Method as you do in the removal of the young *Seedlings* of the other *Trees*; only that for the sliping or laying of such Branches of *Trees* that had not before taken any Wet, the best time is in the Top of the Spring, when the Sap is newly risen, and the *Trees* ready to *Bud*.

All *Ever-Greens* are to be removed in the Spring, for the Cold would kill them before they come to draw *Root*.

All *Aquaticks*, as the *Willow*, *Poplar*, *Oster*, *Alder*, *Aspen*, *Withy*, and the like, that are raised of Sets, are to be planted in the Months of *January* and *February*.

In transplanting be careful to preserve the smalleft *Roots* that gather the Sap, and in filling the Earth about the *Roots* keep them to a Level, with Earth between them; for the well setling these *Roots* conduceth much to the thriving of the *Tree*; and leave as much of the *Root* as you can, cuting only the *Top-Root*, or down right *Roots*, spreading the reft every way, that they may the better get nourishment for the *Tree*.

Plant not too deep, nor below the good Earth into *Gravel*, *Clay*, *Sand*, *Water*, or the like, but rather very shallow, and raise up the Earth about the *Trees* in Hillocks, and as near as you can transplant into better *Mould*, as before directed; and the Holes ought to be made larger and deeper than the *Tree* riquires, to the end it may be filled up with loose Earth, which is better for the young *Roots* to Earth in.

In the setting your *Trees*, you ought to observe a Distance answerable to the sort of *Trees*, as the *Oak*, *Walnut*, and such like spreading *Trees* should be planted at greater distances, at least forty *Foot* asunder. The *Chesnut*, *Ash*, *Beech*, *Fir*, &c. may stand something nearer, and the *Elm*, *Hornbeam*, as also the *Aquaticks*, will grow very near, even to touch one another.

If you water your *Trees* soon after their Transplanting, it conduceth much to their growing, setling the Earth about the *Roots*, except it be in an extream cold Season, and the Plant of a tender kind; however be not wanting of watering any Sort in a dry Season the first Summer after their planting. And if the *Trees* have been carried far, and kept long out of the Ground, although bound about the *Roots* with *Straw*, *Fern*, *Mat*, or the like, as is usual; the best way to revive them is to lay them in Water some time before their Planting.

For the preservation of your *Trees* from *Cattle* it is convenient to Fence them about with Bushes, Boards, Rails or the like, with a Stake for keeping the *Tree* fixt, that the Wind may not loosen it at the *Root*; and when you fasten the *Tree* to the Stalk, fix some *Moss*, *Hay*, or the like to preserve it from gauling.

For

For the better preserving of your young *Trees* from the heat of the Summer or of the Winter, lay about the Roots *Fern*, *Mushy Straw*, *Hay* or the like; also *Stones* are very good for the same purpose, and keep the *Trees* fast at the *Roots* from shaking with the Wind.

Of Pruning, Cutting, Shrouding and Felling of Trees and Coppices.

Pruning of *Trees* is the taking off all Superfluous, and dead Branches, which is a great benefit to the *Tree*; for the doing of which the best Season is in (and about) *January*, and rather whilst the *Trees* are Young, than otherwise; this is to be performed with a Sharp *Bill*, or *Ax*, making your Strokes upwards, to prevent the slitting of the *Tree*, or *Bark*, at the fall of the Branch, and be sure cut it off clean, smooth, and close; for by cutting it otherwise the Stump rotting, will leave a hollow Hole which will decay the *Tree*.

Those *Trees* not fit for *Timber*, but such that are designed for present use, for *Fewel*, &c. may be Lopped, or Shrouded at convenient seasons.

The harder Woods may be Lopped at any time during the Winter season, but the *Elm*, the *Ash*, and such like Pithy and soft Woods, are best to be Lopped in the beginning of the Spring, least the Winter Injure the *Tree*; and it is not good, to Lop them too often; once in ten, or twelve Years being sufficient; and for preserving the *Trees* from decaying, cut the remaining Stumps aslope, and smooth, as before directed, that they may east off the Water which rots them.

Take not off the Head of any *Aquatick*, (before Unlopped) growing upright and smooth after they are about the bigness of a Mans Leg, unless you have some Collateral Shoots to draw up the Sap; for it will endanger the *Tree*.

These *Aquaticks* may be Cut, or Lopped every four or five Years, but cut them not too near the main Stock, which oft times occasions the dying of the *Tree*; especially if too great Lops; also it hinders new Shoots. You may Lop them in *February*, or the beginning of *March*, if designed for Sets, otherwise in the Winter before the Sap begins to rise.

The Growth of *Coppices* is various, according to the Nature of the Ground, so that no prefixt time can be set for the time of their standing betwixt *Felling* and *Felling*, for in some Grounds the Wood will be at a good growth at nine Years; in others at ten, eleven or twelve; whereas in others not until fifteen or more, so that the bigness of the Wood must be your direction, which when grown to an indifferent size, should be felled, for after that it will not grow so fast as at the first.

The Season for falling *Coppices* is from Mid-*September* to Mid-*March*, and let no *Carts* and *Horses* come into the Wood after *March*, for fear of breaking, or bruising the young *Cions*; and also let your Woods be fenced and preserved from *Cattle* cropping the young Shoots in the Spring, which is a very great injury; for it will Stunt them. Cut not above half a *Foot* from the Ground, and slopewise, triming up such as you spare for Standards, which may be left at the discretion of an understanding Wood-Man.

If any *Coppice* hath been neglected and received injury by the browzing of *Cattle*, or the like, so that you perceive the Wood to be stunted, the best way is to fell it down, for let it stand never so long it will not thrive; and after the felling by due care and well ordering, it will thrive as well as any other.

For the Felling of *Timber-Trees* you should consider if they are of full growth; for after that it is ill Husbandry to let them stand, but for the preservation of the growth, and encrease thereof for future Ages, it is good Husbandry to plant two young ones for every one felled. Next, the time of year is to be considered; for if you design your *Timber* for Sale, then the best time for *Oaks* is from Mid-*April* to *Midsummer*, the Sap being then up, so that the *Bark* will run, which is considerable advantage, being bought up by *Tanners*: And if I am not mistaken there is a Statute prohibiting the felling of *Oaks* but at such a Season when the *Bark* will run, but for all *Timbers Trees* the Winter season whilst the Sap is down is best.

If you would have *Oaken Timber* for your own use, then fell it in *December*, or *January*, at which time it is cleareft of Sap, so that it will not be so much subject to the Worm, neither will it cast, twine, or rift, as if cut in the Summer, and it will also last longer in any Building, and not be so apt to yeild under a burthen, for the more Sap is in it, the sooner will it rot and decay.

Fell your *Timber Trees* not in the increase nor full of the *Moon*, nor in windy Weather, for that oft times Spoyls the *Tree*.

If you design to reserve the *Roots* in the Earth, for a new encrease of Suckers, then fell the *Tree* as near the Earth as you can, for that is the best *Timber*; otherwise grub up all the *Roots*.

CHAP. XII.

Of the several Sorts of Beasts, Fowls, and Insects, necessary to be kept, and the great Benefit accruing thereby.

THe *Country Mans* chief Benefit consists in the well stocking his Grounds, with *Cattle*, *Fowls*, and *Insects*; I shall in this Chapter, take Notice of those of most use and profit, omitting the Horse (which may justly claim, Preheminence of all others,) as having already treated thereof, more at large in the Treatise of *Horsmanship*, and shall therefore begin with the *Ox*, and *Cow*;

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The beſt *Cows* and *Oxen* are bred in the Counties of *York*, *Darby*, *Lancaſter*, *Stafford*, *Lincoln*, *Glocester*, and *Somerſet*, both for largneſs and neatneſs of ſhape. Thoſe bred in *York-ſhire*, *Darby-ſhire*, *Lancaſhire*, and *Stafford-ſhire* are generally black, with large well ſpread *Horns*; Thoſe bred in *Lincoln-ſhire* are for the moſt part pide, very tall and large, and moſt fit for labour; Thoſe bred in *Somerſet-ſhire*, and *Glocester-ſhire*, are generally red, and for Shape much like thoſe of *Lincon-ſhire*; *Wilt-ſhire* breeds large *Cattle*, but ill Shaped *Hornes* and *Heads*. Now for the breeding of Store-*Cattle*, 'tis not good to mix thoſe that are Red with the Black ones, for their Shapes and Colours are ſo contrary, that their Iſſue will be very uncomely to the Eye.

Now for as much as the *Males* of all Creatures are the principal in the Breed and Generation, therefore great care ought to be taken in the choiſe of the *Bull*, which for a curious Shape ſhould be as followeth; He ſhould be of a quick and ſharp Countenance, his *Horns* the larger the better, his *Neck* fleſhy, with a broad and curled Forehead, his *Ears* rough within, with Hair like *Velvet*, his *Eyes* black and large, his *Muzel* large and broad at the upper *Lip*, but narrow and ſmall at the neather, his *Noſtrils* wide and open, his *Dew-lap* extending from his nether *Lip* down to his *Fore-booths* large, thin and hairy, his *Shoulders* large, broad and deep, his *Breaſt* rough and big, his *Back* ſtrait and flat, even to the ſetting on of his *Tayl*, which ſhould ſtand high, of a good Length and buſh-haired; his *Ribs* broad and wide, his *Belly* long and large, his *Huckle-bones* round, making his *Buttocks* Square, his Thighs round and well truſt, his *Legs* ſtrait and ſhort joynted, his *Knees* round and big, and his *Hooves* long and hollow. And having a *Bull* with theſe good Shapes, or as many of them as you can, you need not doubt of a good Breed, provided your *Cows* are tolerable good.

COWS.

The *COW* ſhould be choſen of the ſame Countrey as the *Bull*, and as near as you can of the ſame Colour, only her *Udder* ſhould be white, with four *Tetts* and no more, and not fleſhy, but large and lank, and ſuch a one will prove good to the *Pail*; her *Belly* ſhould be round and large, her *Fore-head* broad and ſmooth, with well ſpread *Horns*. The *Cow* affords great profit, as well for the *Dayre*, as for Breed to thoſe that have good ſtore of Ground, and Fodder; for there is no greater profit to be made than by *Cows*, either in raiſing and breeding them up, or by buying them when in *Calf*, and ſelling them with their *Calf* by their ſides, eſpecially near *London*.

The *Dutch Cows* are very good for the *Pail*, giving as much as two ordinary Engliſh ones, being a large ſort, much like an *Ox*, but ill ſhaped *Heads* and *Horns*; they commonly bring two *Calves* at a time.

The Red *Cows Milk* is eſteemed the beſt, but the Black ones brings the beſt *Calves*. The younger the *Cow*, the better for Breed. That *Cow* that giveth *Milk* longeſt, is beſt both for the *Dary*, and for Breed; for thoſe that go long dry are not ſo teeming.

CALVES may be bread theſe too ways; The one to let them run with their Dams all the Year, which maketh the beſt *Calves*, but is not ſo profitable, as loſing the *Cows Milk*; The other to take them from their Dams after ten or twelve Weeks; but for a Fortnight before you wean them, let them have ſome Water put into *Milk* luke-warm to drink; then they are fit, if in the Spring or Summer ſeaſon to put out to *Graſs*, which muſt be ſhort and ſweet, by no means rank; But if in the Winter ſeaſon, to be fed with fine, ſweet and ſoft *Hay*, which put into low Racks, that they may learn to feed thereon; and it were not amiſs to Houſe your *Calves* the firſt Winter in the cold Nights. It is cuſtomary with ſome to take the *Calves* from their Dams after the firſt ſucking, and ſo to bring them up by Hand with flit *Milk*, made only luke-warm; for to give them that which is hot is very dangerous; but this way I hold troubleſome. Thoſe *Calves* that are Calved in four or five Days after the change of the *Moon*, are not good to rear; but ſell them off to the *Butcher*; and the beſt time to rear *Calves*, is from *Michaelmaſs* to *Candlemaſs*. Thoſe *Male Calves* that you intend for *Oxen*, the beſt Seaſon to geld them is in the old of the *Moon*, and when they are fifteen or twenty days old, for then there is leaſt danger; and the *Ox* is ſaid to be higher and larger of Body, and longer *Horned*.

The *OX* is a very profitable Beaſt; for beſides the great benefit made by them when fatted for the *Butcher*, they perform the Office of the *Horſe*, both for Ploughing and Carting, and therefore are much uſed in divers parts of this Kingdom; and thoſe that once make uſe of them, ſeldom quit their Service, for that of the *Horſe*; for they require not that care and charge in keeping; and when they grow old, are fatted for the *Butcher*, ſo that there is not that loſs, as by *Horſes*, nor are they ſubject to ſo many Diſeaſes; 'Tis true, they are ſlower in their Work, but will perform as much with the allowance of more time, and that fault may be eaſily born with. The larger your *Oxen* are, the better both for Draught and Feeding. In matching your *Oxen* for the Yoak, they ſhould be as near as poſſible of an equal ſize, ſtrength and Spirit; for the ſtronger (without great care of the Driver) will wrong the weaker, and the duller will injure the free ſpirited; and thoſe *Oxen* are fitteſt for the Yoak which are of the gentleſt nature. By no means put your *Oxen* beyond their ordinary pace, for that cauſeth heat, which breeds Surfeits, which is found very prejudicial unto them, even ſometimes with the loſs of their lives. Their *Food* is but ordinary, *Barly*, *Oates*, or *Peaſe-ſtraw*, will ſuffice them, and ſometimes for change ſome *Hay* mixt amongſt the Fodder.

For the *Oxen* bred for the *Butcher*, ſee that they are always luſty and healthful, which you may know by a good *Tayl*, and a good *Pyzle*, for if the *Hair* of one or both be loſt, he is a waſter, and will be long in feeding. If they lick themſelves all over, 'tis a good ſign they are fit for the *Butcher*, and will feed, ſhewing fondneſs, and that they take joy in themſelves; yet whilſt they ſo lick themſelves they feed not, therefore if you lay their own Dung upon their *Hides*, it will cauſe them to leave licking, and fall to feeding.

For the knowledge of a fat *Beaſt*, handle his hindmoſt Rib; and if it be ſoft and looſe like *Down*, it ſhews he is outwardly well fed; the like doth ſoft *Huckle-bones*, and a big *Neck* round and knotty; if his *Cod* be big and full, it ſhews he is well Tallowed, and ſo doth the *Crop* behind the *Shoulders*: If it be a *Cow*, handle her *Navel*, and if that be big, round and ſoft, 'tis a ſign ſhe is well Tallowed. Many other Obſervations there are to know fat *Cattle*, but theſe ſhall ſuffice.

Directions to keep Beaſts and other Cattle.

FOr keeping of *Cattle* to the moſt advantage there ſhould be ſeveral *Cloſes* of *Paſture Ground* to put them in, which ſhould be well enclоſed and fenced about with *Ditches* or *Hedges*, the better to ſever and keep apart the greateſt and ſtrongeſt *Cattle* from the weak and ſmall ones, eſpecially in the Winter, when they are fodded; for if all ſorts and ſizes go together, the great and ſtrong ones will over-maſter the others, driving them from place to place, and trampling and ſpoyling more *Fodder* than they eat; And by being *Foddred* abroad, if ſevered as aforeſaid, far leſs will ſerve them than if kept at Houſe, and the *Cattle* will thrive the better; beſides it is an improvement to the Ground.

How to diſpoſe of Cattle at Paſture.

NEither *Cattle*, *Horſe*, or *Sheep* put into a *Field* alone, will eat down the Paſture even, except it be overſtockt, and that is not good; therefore 'tis convenient to put *Horſes* and *Beaſts* together, for there is ſome *Graſs* that an *Horſe* will eat that a *Beaſt* will not: But *Horſes* and *Sheep* will not agree well together, both being ſweet Feeders, and cloſe Biters. *Milch-Cows* and *Draught-Oxen* feed cloſer and barer than thoſe that are Fat.

If a *Milch-Cow* have too much Meat, and grow fat, ſhe will abate her *Milk*, and go to *Bull*; and if a *Cow* be fat at her *Calving* it endangers the hurting her; and where there is too much *Graſs* the *Cattle* feed the worſer, for a Bite to the Earth is ſufficient; for if it be long they will bite off the Top and no more, for that is ſweet, and the other lieth on the Ground and rots, ſo that no *Beaſt* will eat it, but *Horſes* in the *Winter*.

Rules for Buying Cattle.

IF you would buy *Oxen* for the *Plough*, let them be young, and free from *Diſeaſes*, not broken of *Hair*, *Tail*, or *Pizle*. If *Cows* for the *Pail*, let them be alſo young, well ſhaped, thin *Skin'd*, with good *Dugs* and *Udders*. In buying Lean *Oxen* for Graiſing, chuſe thoſe that are young, or at leaſt thoſe that are well Mouthed, and not wanting any *Teeth*; alſo ſuch that have broad *Ribs*, a thick *Hide*, and looſe *Skin'd*. Alſo in buying *Cattle* either fat or lean, endeavour to know where they were bred; for if they come off from better Ground than that you deſign them for, they will not thrive, but rather grow worſe, and likewiſe ſee if they are free from *Murren*, or any *Diſeaſe*.

Now for the preſervation of *Cattle* in good health, it is good to let them Blood (except the *Calves*) every Spring and Fall, the *Moon* being in any of the lower *Signs*; and alſo to give them a Drench made of the Pickle of *Olives*, mixed with an Head of *Garlick* bruiſed therein: And for your *Calves*, let them not go too early to *Graſs*. But *Diſeaſes* being common amongſt *Cattle*, I ſhall take notice of ſome of the moſt common, with Directions for their *Cure*.

DISEASES.

Of the Fever.

THis *Diſtemper* proceeds either from a flux of cold Humors engendred through cold keeping, or from a Surfeit of Food that is raw and muſty. The *Signs* of this *Diſeaſe* are a foaming at the *Mouth*, a *Trembling*, heavy *Eyes*, and *Groaning*: For Cure, Firſt let *Blood*, then give a Drench of about a Quart of *Ale*, boiled with three or four Roots of *Plantin*, and two Spoonfuls of the beſt *London-Treacle*, and alſo ſprinkle the *Hay* with Water.

Of any Inward Sickneſs in Cattle.

FOr any inward Sickneſs, or Drooping, Take a Quart of ſtrong *Ale*, in which boil an handful of *Wormwood*, and half an handful of *Rue*; then ſtrain it, and put therein two Spoonfuls of the Juice of *Garlick*, with the like quantity of the Juice of *Houſe-leek*, as alſo of *London-Treacle*, which give the Beaſt to drink luke-warm in a *Drenching-Horn*.

Diſeaſes in the Guts, as Coſtiveneſs, Cholick, Flux, &c.

FOr the *Flux*, Take an handful of *Wood-Roſe-Seeds*, dried and beaten to Powder, this brew in a Quart of ſtrong *Ale*, and give it to drink; but if the *Beaſt* is dry and coſtive, take an handful of *Fenugreek*, which boyl in a Quart of *Ale*, and give it him to drink luke-warm. And for the *Cholick*, *Belly-ake*, or *Gnawing* in the *Guts*, boyl in the Water that he drinks good ſtore of *Oyl*.

Piſſing of Blood.

THis *Diſeaſe* proceeds either from over-labour, or ſowre feeding; for Cure, Take *Shepherds-Purſe* and boyl it in a Quart of *Red Wine*; then ſtrain it, and put thereto a little *Cinnamon*, and ſo give it to drink.

Of

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Of any Swelling in a Beast.

FOr any outward Swelling, bathe the place with Oyl and *Vinegar* exceeding hot, which will asswage it; but if the Swelling be inward, then boyl in the Water *round Aristolochia.*

For a Cough, or Shortness of Breath.

GIve the *Beast* for several Mornings together, one or two Spoonfuls of *Tar*, dissolved in a Quart of new *Milk*, with an Head of *Garlick* bruised therein.

Diseases in the Lungs.

THe *Lungs* of *Cattle* are much subject to Sickness, which doth appear by much panting and shortness of Breath, with a continual *Coughing*. This *Disease* is cured by the aforesaid Drink, prescribed for a *Cough.*

Loss of the Cud.

TO recover the *Cud*, Take a little sowre *Leaven* and *Loam*, of which make a pretty big *Ball*, which cause the Beast to swallow.

To kill Worms.

TAke *Savin*, chopt small, and mix it with sweet *Butter*, and so give it in round *Balls*. And if you give the *Beast* some *sweet Wort*, mixt with a little *Black-Soap*, in a *Drenching-Horn*, it will cause him to void the *Worms.*

Vomiting of Blood.

THis *Disease* proceeds through rankness of *Blood*, got in rich Pasture after hard keeping, insomuch that the *Blood* will be seen to flow from his *Mouth*. For Cure, First let the Beast *Blood*, and then give to drink *Bolearmoniack* and *Ale* mixt together.

To cause a Beast to Pis.

STeep *Smallage*, or the Roots of *Raddish*, in a Quart of *Ale*, and give it to drink is present help.

The Overflowing of the Gall.

THis *Disease* is known by the yellowness of the *Eyes* and *Skin*. For Cure, Give him a Quart of *Milk*, with *Saffron* and *Turmerick* mixt together, to drink after letting *Blood*; and this do three Mornings together.

A Cow that is Whetherd.

THis is occasioned when a *Cow* after her *Calving* can't cast her *Gleaning*. Now to cause her to Cast it, take the Juice of *Bettony*, *Mugwort*, and *Mallows*, of each three Spoonfuls, which mix in a Quart of *Ale*, and give it her to drink: Also give her to eat scorched *Barly*, and it will cause her to void it.

Of Purging Cattle.

THere is no *Medicine* purgeth better than *Tar*, *Butter*, and *Sugar Candy* mixt together, and given in pretty big *Balls.*

Of faintness in Labour in an Ox.

IF in the heat of the Day, or in his Labour he doth faint, loose him, and drive him to some runing *Stream* to drink; then give him two or three *Ospines* full of parched *Barley* to eat, and he will soon fall to his Labour again.

Breeding Milk in Cows.

IF after her *Calving* she can't let down her *Milk*, give her a Quart of strong *Posset-Ale*, mixt with *Annifeeds* and *Coriander-seeds* beaten to Powder every Morning for some time, which will not only bring down her *Milk*, but much increase it.

Of the Rot in Cattle.

THis *Disease* is known by their Leaness, and continually *Scouring*. Take *Bay-berries* beaten to Powder, *Ivy-Leaves*, *Featherfew*, *Myrh*, and *Elder-Leaves*, a good lump of dry *Clay* and *Bay-Salt*; mix these together in strong *Urine*. Of this give the *Beast* to drink luke-warm about half a Pint, and it will preserve them.

Of Wounds in Cattle.

TO Cure any *Disease* given by *Edge-Tools*, or otherwise, where the *Skin* is broke; Take *Hogs-grease*, *Turpentine*, *Tar*, and *Wax*, of each a like quantity, with a quarter so much of *Verdigrease*; melt all these together into a *Salve*, which spread upon a Cloth, and lay to the Wound.

To Cure a Beast that is Goared by another, or by a Stake.

TAke *Turpentine* and *Oyl*, heat them, and so Tent the *Wound* therewith.

To draw out a Thorn, or Stub.

TAke *black Snails* and *black Soap*, beat them to a *Salve*, and so apply them to the Soar.

Diseases in the Eyes, as the Haw, a Stroak, Inflammation, Pin, or Web.

FOr any general Soarness in the *Eyes*, Take the Water of *Eyebright*, mixt with the Juice of *House-leek*, and wash them therewith. If a *Haw* breed therein, then cut it out, which is easie to do: But if for a *Stroak*, *Inflammation*, *Pin*, or *Web*, take a new laid *Egg*, put out half the White, and fill it up with *Salt* and a little *Ginger*; then Roast it very hard, and beat it to Powder *Shell* and all: Of this Powder put into the *Beasts Eye*, and it will cure it.

Of Diseases in the Neck, as Bruised, Gauled, Swoln, &c.

IF any *Oxes Neck* hath any of the said Infirmities, occasioned by the *Yoak*, Take the *Leaves* of round *Aristolochia*, which beat in a Mortar with *Tallow*, or *fresh Grease*, and anoint the place therewith.

Of Leaness of Cattle.

WHen *Cattle* fall away, which may be known by their *Hair*. First, let *Blood*; then take *sweet Butter*, and beat it in a *Mortar* with a little *Myrh* and the Shavings of *Ivory*, and cause him to swallow down two or three of the said *Balls* fasting; and if it be in the Winter, feed him with *sweet Hay.*

The Murrain in Cattle.

THis *Disease* proceeds from divers Causes, as from rankness of *Blood*, or Feeding, from corruption of the *Air*, from *Floods*, Intemperateness of the *Weather*, or from Infection of other *Cattle*. To prevent or cure this *Disease*, give all your *Cattle* (as well the sound as sick) this following Medicine: Take of old *Urine* a Quart, mix it with an handful of *Hens-Dung* dissolved therein, and give it them to Drink.

Of the Worm in the Tail.

FOr Cure, wash the *Tail* in strong *Lye* made of *Urine* and *Ashen Wood-Ashes.*

Diseases in the Sinews, as Weakness, Stiffness, or Soreness.

FOr Cure, Take *Mallows* and *Checkweed*, which boyl in the Dregs of *Ale*, or in *Vinegar*, and being very hot lay it to the place grieved.

Of Hide-Boundness.

THis *Disease* is occasioned through overmuch Labour, and ill Keeping: For Cure, First let *Blood*, then give him to drink a Quart of *Ale* brewed with *Myrh*, and the Powder of *Bay-berries*, or of the *Leaves*. You must keep him warm, giving him *Hay* that is a little *Mow burnt*, which will cause him to drink, and *Drink* will cause his *Skin* to loosen.

Of Biting with a Mad Dog, or any other Venemous Creature.

FOr Cure, Take *Plantain*, which beat in a *Mortar* with *Bolearmoniack*, *Sanguis-Draconis*, *Barly-Meal*, and the Whites of *Eggs*; This make up into a *Plaister*, and apply to the *Soar*, renewing it once a *Day.*

Of the Foul, or any other Grief in the Hoof.

TAke *Mugwort*, beat it in a *Mortar* with hard *Tallow*, and apply it to the *Hoof*. Also cast the *Beast*, and with a *Hay-Rope* rub so hard between the *Hoof* that you make it bleed; then anoint the place with *Tar*, *Turpentine*, and *Kitching-Fee* mixt together; then bind up the *Hoof*, and keep him out of the *Dirt.*

Of Lice and Ticks.

BEasts that are bred in *Woods* under Dropings of *Trees*, or in barren unwholsom places, are subject to *Lice*, and *Ticks*. For Cure, Anoint their Body with fresh *Grease*, *Pepper*, *Staveacre*, and *Quicksilver*, beaten together until the *Quicksilver* be killed.

SHEEP.

SHEEP deserve the next place, if not the priority, for the great benefit accruing thereby (especially if Fortune favours to keep them Sound) in a threefold manner; First for *Food*, next by their *Wool* for Clothing, and thirdly by *Dunging* and *Manuring* the Ground, being Foulded thereon, to the great enrichment thereof.

Therefore if you will stock your self with good *Sheep*, you must have regard to the nature of the Soil where you dwell; for according to the Earth and Air, *Sheep* do alter their natures and properties; the barren *Sheep* becoming good in rich *Soils*, and the good *Sheep* barren in ill *Soils*; so that if you would have *Sheep* of a fine Staple of *Wool*, buy those of *Herefordshire*, about *Lempster* parts; also in that part of *Worcestershire* bordering on *Shropshire*; yet these *Sheep* are very little of *Bone*, are *black Fac'd*, and bear small *Fleeces*. The *Sheep* about *Cotsal-Hills* are better Bond', Shape, and Burthen; but their Staple is courser and deeper. The *Sheep* in that part of *Worcestershire* joyning to *Warwickshire*, and many parts of *Warwickshire*, also all *Leicestershire*, *Buckinghamshire*, with part of *Northamptonshire*, and that part of *Nottinghamshire* which is exempt from *Sherwood Forest*, are large *Boned*, are of a good Shape and deepest Staple, especially if they be *Pasture Sheep*; but their *Wool* is courser than that of *Cotsal*. *Lincolnshire* (especially in the Salt *Marshes*) have also large *Sheep*, but not the best *Wool*. All these large sized *Sheep* (especially *Weathers*) find good vent amongst the *London Butchers*, to the no small profit of the Grasier. The *Sheep* in *Yorkshire*, and so Northwards, are of reasonable big *Bone*, but of a Staple rough and hairy: And the *Welsh Sheep* are generally esteemed the worst of all, for they are both little, and of a worse Staple; but their *Flesh* is excellent for its sweet taste. The *Sheep* of *Dorsetshire* are esteemed for bringing two *Lambs* at a time, and are a good sized *Sheep.*

Therefore the Natures and Properties of the *Sheep* of the several *Counties* being known, when you intend to stock your Grounds be sure to

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bring your *Sheep* from a worse *Soil* to a better, and not from a better to a worse; for the *Ground* or *Lear* on which the *Sheep* lieth, and gives him his Colour, is much to be regarded; the red *Lear* is esteemed the best; the *Duskish* that inclines to a little *reddish* is tollerable good, but the white or dirty *Lear* is altogether bad. In the choice therefore of your *Sheep*, chuse the biggest *Boned*, with the best *Wool*, provided your Ground be fit for them, as before taken notice of.

In the choice of your *Sheep* for Breed, be sure have good *Rams*, for they either mar, or make a Flock; and for Shape, should be long and large of *Body*, with a broad and well rising *Forehead*, a chearful large *Eye*, broad *Back'd*, round *Buttocks*, a thick *Tail*, short joynted *Legs*, and his Body well covered over with thick *Wool*; and above all, 'tis the Opinion of some to chuse them without *Horns*, for the *Dodder Sheep* prove the best Breeders, and their Issue doth never endanger the *Ewes* in *Teaning*, as the Horned *Sheep* do.

The best time for your *Ewes* to Lamb in (if they be *Pasture Sheep*) is about the latter end of *April*, and so to the beginning of *June*; but if they be *Field Sheep*, then from the beginning of *January* to the end of *March*, to the end their *Lambs* may be strong and able before *May-day*, to follow their *Dams* over the *Fallow Grounds*: For those that *Lamb* very early, require great care in looking after, with no small charge to bring them up at House with good *Fodder*.

About *Michaelmass* is a good time to Geld those that you design for *Weathers*; first making choice of the goodliest for *Rams*.

The best time to *Sheer Sheep* is from *June* to *August*, and always Wash them three days before *Shearing*. *Ewes* are generally good *Breeders* from three Years old, until their Mouths break.

For the preservation of your *Sheep*, feed them for the generality upon high or Hilly Grounds, which are dry and fertil, with short but sweet *Grass*. But if you are constrained to feed on low and moist *Grounds* which are Infectious, then bring not your *Sheep* from the *Fold* until the *Sun* is risen, and that the *Beams* begin to exhale the *Dew* from the Earth; and then suffer them not to feed at first, but chase them gently up and down with your *Dog* until they are weary; and so this *Chasing* not only beateth away those *Webs*, *Kells*, and *Mildews* that hang upon the *Grass*, which occasions the Rottenes of a *Sheep*, but also stirreth up that Natural heat in a *Sheep*, which drinketh up and wasteth that Moisture which otherwise would turn to *Rotteness*; besides, a *Sheep* thus chased and wearied, will fall to his *food* with more deliberation.

If your *Shepherd* once in about a Month, or when he hath occasion to handle his *Sheep*, do rub their Mouths with *Bay-Salt*, 'tis a great preservative against *Sickness*. But forasmuch as *Diseases* are common amongst them, I shall take notice of the Principal, with Directions for their *Cure*.

Signs to know a sound Sheep, as also an unsound one.

IF a *Sheep* be found and in health, his *Eyes* will be bright and chearful, the White pure without Spot, and the Strings Red, his *Gums* also will be red, his *Teeth* white, his *Skin* on his *Brisket* red, his *Skin* in general will be loose, and his *Wool* fast set on. But if unsound, his *Eyes* will be heavy, pale, and spotted, his *Breast* and *Gums* white, his *Teeth* foul and yellow, and his *Wool* easie to pull off; and when he is dead, his *Belly* will be full of Water, his *Fat* yellow, his *Liver* putrified, and his *Flesh* moist and waterish.

Of Sickness in General, or the Fever amongst Sheep.

FOr Cure of this *Distemper*, change of Pasture is very profitable. Also, Take *Puliol* Royal, stamp it, and mix the Juice with *Water* and *Vinegar*, and give each of them about half a Pint in a *Drenching-Horn* luke-warm.

Of the General Scab, or Itch in Sheep.

THis is a common *Disease*, and proceedeth from Wet and Rainy *Weather*, so that if they be chaft or heated after the Wet hath fallen upon them, they commonly break forth into *Scabs*; and the usual Cure amongst *Shepherds*, is to anoint the place with *Tar* and *Grease* mixt together. But if at the first coming you wash their Skins with *Puliol Royal* steept in Water, it will prevent the runing into the *Scab*.

Killing Maggots in Sheep.

FOr Cure, Take *Goose-Grease*, *Tar*, and *Brimstone*, mixt together on the Fire, and anoint the place therewith.

Diseases in the Gall, as the Jaundies, Choler, &c.

THese *Diseases* are known by the yellowness of the *Sheeps Skin*. For Cure, Take *Plantain* and *Lettuce*, stamp them together, and mix the Juice with *Vinegar*, and give to each *Sheep* about half a Pint to drink.

Of the Sturdy, Turning-Evil, or More-found.

THese Distempers proceed from rankness of *Blood*, which offends the *Brain*, and other inward Parts. For Cure, Let them Blood in the *Eye-Veins*, *Temple-Veins*, and through the *Nostrils*, and then rub the places with young *Nettles* bruised.

Of Broken Bones, or Bones out of Joynt.

FIrst, Set it strait and right; then bathe it with *Oyl* and *Wine*, and dip a *Cloth* in moulten *Patchgrease*, which roul about it; then Splint it as occasion shall serve, and so let it remain for about nine Days, and dress it again; and at the end of the next nine Days the *Sheep* will be able to go.

Of the Tag'd, or Belt Sheep.

THe Cure of this is, with a Pair of *Sheers* to cut away the *Tags*, laying the Soar bare and raw; then strew dryed Earth upon it, and after that *Tar* and *Goose-grease* mixt together.

Of the Staggers.

THis *Disease* proceeds by Surfeiting on *Hawthorn Leaves*, *Oak Leaves*, or the like, which *Lambs* especially are very subject unto, and if not timely prevented is Mortal. For Cure, Take *Asafetida* dissolved in Water, and put the quantity of half a Spoonful thereof into each Ear of the *Sheep*, or *Lamb*.

Loose Teeth.

FIrst, let Blood in his *Gums*, and under his *Tail*; then rub his *Teeth* with *Earth*, *Sage*, and *Salt*.

The loss of the Cud.

THat which restoreth the *Cud* to an *Ox* or a *Cow*, will do for a *Sheep*.

Of Worms in the Guts of Sheep, or Lambs.

THis *Disease* is known by their beating their *Bellies* with their *Feet*, and looking upon it. For Cure, Take the *Leaves* of *Coriander* stampt, mix the Juice with *Honey*, and give it him to drink; then chase him a little, and keep him from eating two or three hours.

Of Lung-sick, or any Cough or Cold.

THis *Disease* is known by its Coughing, and shortness of Breath. For Cure, Take *Coltsfoot*, and *Lugwort* stampt and strain'd, and the Juice mixt with a little *Honey* and *Water*, which give the *Sheep* to drink.

Diseases in the Eyes, as the Haw, Dimness, or any Soreness.

TO Cure these *Diseases*, drop into the *Eyes* the Juice of *Selandine*.

To preserve Sheep from the Rot.

THis *Disease* is the worst of all, as being Infectious, therefore great care ought to be had to prevent it, which may be done by care, and following these Directions. So soon as you find that any are tainted, Take *Adraces*, which is a certain *Salt* gathered from the Salt *Marshes* in the heat of *Summer*, when the Tide is going off, and leaving certain Drops of Salt Water on the *Grass*, which the heat of the *Sun* turns to *Salt*. With this *Adraces* rub the Mouths of all your *Sheep* once a Week, and it will preserve them sound. Of this *Adraces* great plenty is in *Spain*, and may be easily made in divers parts of *England*, where the *Sea* overflows at *Tides*.

To cause Ewes to be easily Delivered.

TAke *Balsa-mint*, or *Horse-mint*, and put either the Powder, or the Juice thereof, into a little strong *Ale*, and give it her to drink, and she will soon *Yean*, or *Lamb*.

Of increasing Milk in Ewes.

NOthing encreaseth *Milk* more than change of Pasture, driving them sometimes on the *Hills*, and other times in the *Vallies*, and where the *Grass* is sweet.

To cause an Ewe to love her Lamb, or any others Lamb.

TAke a little of the *Glean* of the *Ewe*, and force her to eat it, or at least to chew it in her Mouth, and she will fall to love it. But if an *Ewe* hath cast her *Lamb*, and you would have her to take another *Ewes Lamb*, take the *Lamb* that is Dead, and with it rub and dawb all over the Live *Lamb*, and so put it to the *Ewe*, and she will take it naturally, as if her own, provided it be not too old.

Of any Sickness in Lambs.

GIve them *Mares-Milk*, or *Goats-Milk*, or its own *Dams Milk* mixt with *Water* to drink, and keep it very warm.

To know the Age of a Sheep.

LOok into his Mouth, and when he is one *Shear* he will have two broad *Teeth* before; when he is two *Shear*, he will have four such like broad *Teeth*; when he is three *Shear*, he will have six; and when he is four *Shear*, he will have eight, and after those Years his *Mouth* will begin to break.

SWINE.

SWINE are of that great profit, that he that hath *Sheep*, *Swine*, and *Bees*, let him sleep or wake is sure to thrive, being a great support to a Family, affording great variety of *Meat*, as *Pigs*, *Pork*, *Bacon*, and *Brawn*, besides their Offal, which is very good *food*. And *Hogs* require the least charge in keeping of any other *Beast*; for their *Food* is course and ordinary, being contented with any thing, so that they have but their *Bellies* full, as *Whey*, *Flit-Milk*, *Wash*, *Grains*, *Offal*, *Corn*, *Carots*, *Parsnips*, *Colewoorts*, *Cabage-Leaves*, *Bean-tops*, &c. And it were not amiss if a parcel of Land were planted with such like *Garden Food*, on purpose to feed them.

Now for the Keeping them, some are of Opinion, 'tis better to have a *Hog-yard* with *Styes* in it, and there to keep them penned up, than to have their liberty, for then they wast their Flesh, and will not fat so soon. Yet after *Harvest*, to let them have the benefit of eating up the *Corn* left on the Ground would be profitable. And some are of Opinion, that 'tis better to keep all *Boars* and *Sows*, and no *Barrows*; for a *Boar* will require as little keeping as a *Barrow*, and is much better, having more Meat in him, and if you make

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make it into *Brawn* is far dearer; and for *Sows*, before they are fit to kill, may bring more *Pigs* than they are worth, and notwithstanding be as fit for *Bacon* as *Barrows*, provided they are not too old, for a *Sow* will bring three *Litters* a Year, and commonly nine, ten, or twelve at a time; but the only reason against keeping too many, is the great trouble attended with the charge of bringing up the *Pigs*, either fit for the *Market*, or for *Store*.

For the choice of your *Swine*, both *Boars* and *Sows* that you design for a Breed, let them be long and large of Body, deep *Sided*, and *Bellied*, thick *Necks* and *Thighs*, short *Legs* and thick *Chined*, well set with strong *Bristles*; as to their Colour it matters not much, but the *White*, or *Sandy* are esteemed the best, the *Pide* being held the worst, as subject to the *Measles*.

A *Sow* will bring *Pigs* from a year old until seven; and the *Pigs* best to rear are those farrowed in or about *Lent*, and in *Summer*, for in *Winter* the cold doth much pinch them and keep them back; then having chosen out the best for *Boars* and *Sows* to breed on, Geld all the *Males*, and Spay the Females you design to Rear, for both will make the best *Hogs* for fatning, and yield more *Lard*.

For Fatning of *Swine* it differeth much, having regard to the *Country* where you dwell; for those that inhabit near Woods, and places where *Mast* is plentiful, turn them unto the *Mast* for six, or eight Weeks, by which time they will be much improved as to Flesh, and then put them into *Styes* to fatten, with old dry *Pease*, which makes their Fat Firm and not to wast away in boyling. But *Swine* fatned with *Acorns*, or *Chesnuts*, or with *Parsnips*, makes the Flesh of an excellent sweet taste; and if in Salting you use *Salt-Peter* mixt with *Bay-Salt*, the *Bacon* will imitate that of the *Westphalia*.

Those that dwell in *Champain Countreys*, or by Cities or great *Towns*, destitute of Wood for *Mast*, do use to put their *Hogs* they design to fat into *Sties*, and to feed them with *Pease*, *Beans*, *Buck-Wheat*, or such that they have; but *Buck-Wheat* is not good, making the Fat soft and subject much to wast, without they are kept some time before their killing only which *Pease*, or *Beans*; for midling sized *Pork*, three Weeks is enough to fatten them, and four Weeks for *Bacon*.

To cause Hogs to thrive.

IF your *Hogs* do not thrive (which is seen by the staring of their Hair, and looking rugged) take half a Peck, or more of *Ashes*, boyl them into *Lye*; then cause such *Hogs*, to be laid upon a Form, and wash them with the *Lye*, and curry them with an old *Curry-comb* until you find all the Scurf washt from the *Skin*; then wash them with clean Water, and Strew dry *Ashes* over them, and this will kill the *Lice*, and cause them to thrive extraordinarily. Now the greatest thing that hinders *Hogs* from thriving, is to let them lye in the Wet.

There is no Creature so timerous in Sickness as the *Swine*, insomuch that he forsakes his Meat, until he finds a Recovery. Now when you find your *Swine* to droop and forsake their Meat, first let them *Blood* under the *Tayl*, and *Ears*, and if they Bleed not well, beat them about, which will cause them to Bleed; the Wounds wrap up and keep warm, and give them to drink warm *Wash*, well mixt with *Bearly Meal*, and red *Oaker*.

The Murren.

THis *Disease* is very common and dangerous, if not early prevented: For Cure give them in their warm *Wash*, *Hens-dung*, and boyld *Liverwort*, with a little red *Oaker*.

The Meazles.

THis is also a common Disease, and easily cured; Take Urine that hath been some time made, and mix it with red *Oaker*, until it be thick, and about an *Ale-quart*; this mix with a Gallon of warm sweet *Whey*, and give it them to drink, after they have been kept all Night fasting.

Of Leanness, Scurf, and the Mange.

THese diseases proceed from corrupt *Blood* occasioned by scanty feeding, and lying wet; for Cure first let *Blood* under the *Tayl*; then with a *Wool-Card*, or *Curry-comb* rub them well over to fetch off all the *Scurf* and *Filth* until they Bleed; then take *Tarr*, *Hogs-grease* and *Brimstone*, well mixt together, and anoynt them therewith; then cause good dry, sweet *Straw* to be put into their *Stye*, and let them have good warm *Food*, which will soon recover them, and cause them to thrive.

To Cure Swine that are lugged in their Ears by Dogs.

ANoynt the *Ears* with *Vinegar*, *Sope* and *Tallow* mixt together, and if through want of looking after they Breed *Magots*, take sweet *Wort*, or *Honey*, and anoynt the Sore therewith, and the *Magots* will soon fall off and dye.

ASSES.

THe *Ass* is a very serviceable *Beast* for divers affairs, and is kept with little or no Charge, by reason of their hardiness, mean feeding, and worse looking after; they patiently enduring *Hunger*, *Thirst*, *Labour* and *Blows*, and were it not for their ill quality of *Barking Trees*, they would be more set by. *Asses Milk* is esteemed an excellent restorative in a *Consumption*.

GOATS.

THis *Beast* is also very pernicious to keep, for their *Barking* of *Trees*, and other mischevous *Tricks*; so that I cannot recommend them to any to keep, but to such that live in rocky, mountainuos places, hardly fit for any thing else.

I should here treat of the *Coney*, which is a very profitable Creature, and a great help to a Family; but having discoursed thereof in a Chapter at large in the Treatise of *Hunting*, I shall omit it here, referring you to the same.

FOWL, or POULTREY.

THere is no greater benefit than that which ariseth by *Fowl*, and they are so absolutely necessary, that a Countrey Habitation cannot be deemed compleat that is not well stored with them; and as to the charges in keeping them, 'tis inconsiderable, if the great profit that may be made thereby (if well ordered) be rightly considered, as well by their *Eggs* and *Feathers*, as by their Bodies, and young *Chicken* to the *Poulterers*; besides the supplying your own *Table* therewith; and to those that live within a Days *Journey* to *London*, for a quick sale of them, there can be no greater benefit made than by *Fowl*, for they always meet with good *Markets*; also the *London Poulterers* will be desirous to take them off your Hands.

Of the Hen-house, and it Situation.

THe *Hen-house* should be large, but with consideration to the quantity of *Fowl* you keep; let it be high roofed, and withal strong and secure built for preserving them from *Thieves*, and with Shuts to the Windows to keep out *Vermine*; let there be dispersed about it *Pens* or *Coops* for the *Fowl* to be put in that are with *Egg*; and those for *Geese*, and *Turkeys* must be larger and higher then for *Hens*; and on the sides of the Walls, and thwart the House in convenient places should be long *Perches* for *Cocks*, *Hens* and *Turkeys* to Roost upon. As for the *Geese* and *Ducks* they sit on the Ground, or in the *Pens*; and to the end the *Fowl* may the better get up to the *Roosts*, let there be *Pins* (that is short pieces of Wood) drove into the *Walls*, with Steps, in imitation of *Ladders*, for them to hop up to the said *Roosts*, which are very commodious, especially for the young ones. Let not the Floor be paved, or boarded, but of *Earth* made smooth, and even like a *Barn Floor*. And it were convenient to have a Hole made in the *Groundsel* for the *Chickens*, and young *Fowl* to come in and out at, with a Shutter at night for the keeping out *Vermin*. The *Coops*, or *Pens* as very convenient to put in those *Fowl*, that by the *Servant* that tends them are found with *Egg* at night, to the end their *Eggs* may be preserved; for if they should be suffered to make Nests, and to lay abroad, not one in Ten would be found good, for they will be subject to *Weasels*, or the like *Vermin*; or if found, may be stale and useless. And to keep all the *Poultry* in the House until all have laid, will be a great prejudice to the rest, as being deprived of their early morning feeding for Worms; But for *Geese* when they have once chosen their Nests, they will always lay there, so that they need not be pen'd up.

But according to the opinion of the experienced *Housewife*, *Fowl* that sit, be they *Hens*, *Turkeys*, *Geese* or *Ducks*, should have places apart, where other *Fowl* cannot come to disturb them, which oft-times occasions them to forsake their *Eggs*. Tis not material to direct what places, most *Houses* having that convenience; if not, such places must be made; especially if great store are kept.

The best way to keep *Eggs* long and good, is in a *Heap* of old *Malt*, close covered over.

Feeding your Fowl.

FOr the feeding your *Poultrey* it is various; *Buck*, or *French Wheat* will soon fat them; but 'tis a loose Fat, and will wast upon the Spit. *Hemp-seed* is good to lay *Eggs*, the like doth *Nettle-seeds*, a little being mixt with the *Oats* or *Barley*; and it is convenient to observe set times for the feeding them, as early in the Mornings, and just before their going to *Roost*, which will bring them to a good order, and to become tame, and readily go to the *Henhouse* to *Roost*; about the quantity of half a handful of *Oats*, or *Barly*, to each *Fowl* is sufficient at one time, for if you feed your Store-*Fowl* too much, their fatness will hinder their laying; besides they will lay their *Eggs* without Shells. There are divers other things very good to feed *Poultrey*, as also *Turkeys* with, as *Parsnips*, and *Carots*, which must be washt, sliced, and so boyled tender in fair Water; then mix them with *Meal* made up into a Past, and feed them therewith, which is an excellent fat feeding; but not good for your Store-*Fowl*, only for such as you design for the Spit. *Sea-Bisket* is very good Food, being steeped in fair Water, over a gentle Fire until it is soft, and so give it them; it is bought very cheap on *Shipboard* at their return from *Sea*. *Grains* are very good Food for *Ducks*; and it is observed, that if you put into the *Past* aforesaid, a little *Sugar*, it much quickens their fatning.

If the *Range* for *Powltrey* and *Turkeys* is large, they will get good part of their living by *Worms*, the Seeds of *Herbs*, *Bugs*, and the like. *Ducks* feed much on *Duckgraves*, as also on *Frogs*, *Slugs*, and such like things that are hurtful to your *Garden-plants*, so that they are very necessary to be kept there; and for *Geese*, their *Food* is much on *Grass*.

For fatning of *Poultrey* 'tis the opinion of some, that if they are kept in dark places, they will fat the sooner.

Stubble-Geese, as also *Green-Geese* are best fatted if kept dark, and to be fed with ground *Malt* mixt with *Milk*. On their *Rumps* there is a small Bunch of *Feathers* which in the Nights they usually suck with their *Bills*, drawing out a moisture thereat, which Bunch of *Feathers*, if cut away before they are put up to fatten, they will fat much sooner, and with less Meat, so that 'tis said that the *Jews* knowing of this inconveniency, use to tye them up in a *Cloth*, hang them in a dark place, stop their *Ears* which *Peases* to hinder their hearing any noyse, and so feed them with *Pellets* made of ground *Malt*, or *Barley* steeped in Water; as also to set *Gravel* and *Water* by them,

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which much whets their Stomachs, and causeth them to fat sooner.

For Setting of Poultrey.

THe best time for Setting *Poultrey*, to have the best, largest, and most kindly *Chickens* is in *February*, and in the Increase of the *Moon*, so that they may hatch in *March*; one Brood then Hatch'd being esteemed worth two or three at any other time; yet they prove good if Hatch'd in any of the Summer *Months*; and it is observed to be best to Set them on odd *Eggs*. It is a great advantage to Set *Turkeys* on *Hen-Eggs*, for they Set a *Month* with their own, and in six Weeks they will hatch two Broods of *Hen-Eggs*; and the first *Brood* may be put to such *Hens* that have but a few *Chickens*, or that have had some Misfortune, by Adling their *Eggs*, or the like.

Be sure to Set your *Poultrey* with New-laid *Eggs*, which you may easily know by holding them up against the *Sun*, for such will be clear; also they are heavier than stale ones. And chuse not the largest *Eggs*, for they take up too much room, so that you can't set under her so many.

The *Hens* having Hatch'd their *Chickens*, take them and the *Hen* to be kept in some convenient place in the House, and after a Day or two give them small *Oatmeal*, some dry, and some steept in *Milk*; and when a little bigger, larger *Oatmeal*, Crums of *White-Bread*, *Curds*, *Barly-Meal* soaked, and the like, until they grow big enough to eat *Oats*, or *Barley*; also to chop green *Chives* amongst their Meat is very good. Be sure let them not want Water, for that breeds the *Pip*.

If you would have Cram'd *Chicken*, let them be put into the *Coops* so soon as taken from the *Hen*, that is, when she forsaketh them; and the best *Cram* is *Wheat-Meal* and *Milk* made into *Dough*, and the *Crams* steept in *Milk*, and so thrust it down with your Finger in small *Pellets*. A Fortnight is sufficient to fat them in.

Of Capons.

Capons, which are the *gelt Cock-Chickens*, should be *gelt* so soon as the *Hen* hath left them, if the *Stones* be so soon come down, or else so soon as they begin to *Crow*; for the Art of *Gelding* them is common, and soon learnt by seeing one or two *gelt*. As for the *Cramming* them for the *Table*, Take *Barley-Meal* well sifted, mixt with *New-Milk*, which make into good stiff *Dough*, and so into *Pellets*, and feed them therewith, being wet in warm *Milk*; let them have their *Crops* full, and feed them three times a day, *viz. Morning*, *Noon*, and *Night*, and in a Fortnight, or three Weeks, they will be fat enough.

Diseases that Poultrey are most subject unto.

THe *Pip* is a white thin *Skin*, or *Scale* growing on the Tip of the *Tongue*, which hinders their feeding, occasioned from drinking foul Water. For *Cure*, Pull off the said *Skin*, and rub the *Tongue* with *Salt*.

LICE in *Poultrey* is chiefly from corrupt Feeding; the *Cure* is, by bathing them in warm *Water*, with small *Pepper* mixt therein.

Stinging by *Venemous Creatures* appears by their *swelling* and *drooping*; for *Cure*, anoint them with *Rue* and *Butter*.

Poultrey are oft troubled with swellings in their *Rumps*, which in time will corrupt the whole Body. The *Cure* is, to pull away the *Feathers*, opening the *Soar* and thrust out the *Core*; then wash the place with *Salt* and *Water*, or *Brine*.

To cause *Hens* to *SIT*, bathe them oft in cold *Water*, and thrust a small *Feather* through their *Nostrils*.

Hens that *CROW* are very unnatural; to remedy which keep them from other *Poultrey*, and feed them with scorched *Barley*, or small *Wheat*.

For *Hens* that are *Crow-trodden*, there is no remedy but to kill them. It is to be known by the staring of their *Feathers*, and hanging their *Wings*.

GEESE.

GEESE, as aforesaid, are very profitable to be kept, their chief food being *Grass*, and that the worst, as in *Commons*; they are not to be kept without the convenience of *Water*.

They begin to *Lay* early in the Spring, and the sooner the better; before they begin to *Lay* they will carry up and down *Straw* in their *Bills*, and when they will *Sit*, they will keep their *Nests*, so that then put their own *Eggs* to them. In about a Month the *Eggs* will be Hatch'd; then keep them some time in the *House*, feeding them with *Curds*, *Barley-Meal* wet in *Milk*, ground *Malt*, or *Bran* moistned in *Milk* or *Water*; and having gathered a little strength turn out the *Goose* with her *Goslings* to feed, &c. still observing to feed them as aforesaid, until they are fit to shift for themselves. In about a *Month* they will be fit to put up to Fat for *Green-Geese*; and for their Fatting feed them thrice a Day, that is, *Morning*, *Noon*, and *Night*, with plenty of *Skeg-Oats* boiled, with *Milk*, or *Milk* and *Water* mixt to *drink*.

For the Fatning of *Geese* let them take the benefit of the *Stubble* after *Harvest*, which will make them fleshy; and then put them up in *Coops* apart dark kept, and let them have always by them good *Oats*, or spelted *Beans*, and for their Drink *Water* mixt with *Barley-Meal*, and this will fatten them in about three Weeks, or you may observe the same Directions, as aforesaid.

For the pulling off the *Feathers*, as some use, I hold it not good, being prejudicial unto them.

The general Infirmity that *Geese* are troubled with, is the *Gargil*, being a great stopping of the *Head*. For *Cure*, Take three or four *Cloves* of *Garlick*, beat them in a *Mortar* with sweet *Butter*, of which make little long *Balls*, and give two or three of them to her fasting, keeping her shut up for about two hours after.

TUR-

TURKEYS.

THis *Fowl* is very profitable, if you understand how to order them rightly. The Young ones are very tender, and subject to the *Cramp*, especially if too tenderly kept, not permitting them to go abroad with their *Dams*; so that 'tis observed, that a *Turkey* that sits her self, and brings forth her Young without Housing, comes to more good, as not subject to the *Cramp*, that so often kills those kept in the House, when they are put out in the *Dew*. They are generally inclined to rove or stray from their *Dams*, which are also very negligent of them; for if she hath but one following her, she will not regard the rest, which oft proves the loss of them, without an Eye over them.

Turkeys begin to Lay about *March*, and will Sit about *April*, and Hatch in about a Month. They are very subject to Lay abroad, so that care must be taken to put them in the *Hen-house*, Cooping up those that the Servant finds with *Egg* at Night, as afore-directed.

The Young ones are fed with *Curds*, *Milk*, and *Bread*, and let their Drink be *Milk* and *Water*. When they have got strength put them abroad in some warm place, and turn them not out till the Dew is off the *Grass*, and so *House* them at *Nights*.

For Fatting *Turkeys*, put them in *Coops*, and for the first Fortnight feed them with sodden *Barley*, or *Oats*, and afterwards Cram them as *Capons*, as before directed.

DUCKS.

THis *Fowl* is no less profitable than the rest, and less chargeable in keeping, generally being their own *Purveyers*; but 'tis good to feed them Mornings and Evenings to keep them tame, and to accustom them to the *House*, so that when night comes they will be drawing home; these, or indeed any other *Fowl*, may be called home at any time when you desire, by a *Pipe* or any whistling Noise, and to bring them to it, is always when you feed them, to make such a Noise, so that when they hear your *Pipe*, or *Whistle*, they will immediately come in expectation of *Food*; but never call them, but Feed them, be it never so little. *Grains* is very good for them. They are great *Layers* when they begin; they Sit about a Month, and the *Ducklings* must be ordered and fed, as your *Goslings*, only giving them *Clivers* chopt in Water, or *Duckgraves*, and when they are abroad will better shift for themselves than the *Goslings*. *Ducks*, or *Ducklings*, are easily fatted, giving them good store of any kind of *Grain*.

PEACOCKS.

THis *Fowl* is more for the delight of the *Eye*, than profit; however a few may be kept. They are great Enemies to *Fruit-Trees* and *Gardens*, pulling off the *Buds*. They delight much to feed on *Toads*, *Newts*, and such Venemous things which makes their *Flesh* unwholsom; The *Pea-Hen* loves to lay abroad in *Bushes*, *Hedges*, and the like secret places that the *Cock* may not find her *Eggs*, for he will break them. They sit a Month. Feed her young with *Cheese-Curds*, and *Barly Meal* mixt with *Water*. They are very tender until grown a little big, the least Cold killing them, so that let them not go abroad, but in Sunshiny or Warm Weather. This *Fowl* being not for the *Dish*, I shall not prescribe Rules to fat them; but as for their keeping, any *Grain* serveth them, and that they will get themselves, if possible.

SWANS.

THis is a stately *Bird*, but seldom kept; for they require large Waters, and then they will live on what they can get themselves; but in *Frosty Weather* they must be fed. When they make their *Nests*, do not disturb them. For feeding the *Cignets* for the *Dish* observe the same Rules as for *Geese*; or if you have the conveniency of a small piece of Ground with a Pond in it, which is encompassed with a *Pale*, or *Wall* you may feed them there, puting two *Troughs*, one for old dryed *Malt*, and the other for *Barly* and *Water*, and this way they will be sooner fatted than in a House.

Herns, Puets, Gulls, and Bitterns.

HErns, are nourished for too reasons, the one to make *Trains* for enring *Hawks*, or else for the *Table* at Feasts. The way to bring them up is to take them out of their *Nests* before they can fly, and put them in a large high *Barn* that hath many high cross *Beams* for them to *Perch* upon; and to have on the *Floor* several *Boords* about two Yards square, with Rings in them, and there to place round shallow Tubs of Water, and to the Boords ty great Gobbets of *Dogs-Flesh*, according to the quantity you feed; and be sure to keep the place sweet, and oft shift the Water; and let the Roof be so that Rain may fall in several places, which they much delight in; but if you feed any for the *Dish*, then instead of *Dogs-Flesh*, give them *Livers*, or the Intrails of *Beasts* or *Fowl*, cut in pieces. And after this manner you may feed the *Gulls*, or *Bitterns*.

To feed Pheasants, Partridges, and Quails.

THese may be kept, and fed in one large Room, where you may have in divers Corners, *Boxes* for them to run in to hide themselves, and in the midst of the Room let there be placed three *Wheat-sheafs*, two with their *Ears* upwards, and the other with the *Ears* downwards, and near unto them shallow Tubs with fair Water, to the end they may eat and drink at pleasure, which will make them soon fat.

As for the *Quail*, the best way is to keep them in long flat *Boxes*, or *Coops*, with the Sticks or Wyers on the fore-side no wider than for them to put forth their *Heads* to feed, or drink out of the *Troughs*; their *Food* is good small *Wheat*, and fair Water to drink.

You

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You have been told several ways how to take *Pheasants*, *Partridges* and *Quails*, in the Treatise of *Fowling*, to which I refer you; omitting it here; and having so taken them, put them into your Room, as aforesaid.

To feed Goodwits, Curlews, Gray-Plovers, and Knots.

Fine Chiltern, or small Wheat is very good; let them be fed *Mornings*, *Noons* and *Nights*, and to have fresh clean Water; but the quicker way is to Cram them, and then use fine dresst *Wheat-Meal*, mixt with *Milk*, with some of the said *Wheat*, and so made up into Past, and feed them with *Crums* thereof dipt in Water, giving them their *Gorges* full; and so keep them feeding as oft as their *Gorges* are empty.

PIGEONS.

Pigeons either wild or tame are very profitable and serviceable for the *Table*, but the wild affords the greatest, by reason they get their *Food* abroad, except it be in hard frosty and snowy Weather, when nothing is to be got, and about *Mid-summer* before *Pease* are ripe, this Season being called *Benting-time*, as being then constrained to feed on the Seeds of *Bent-grass*; and at those times they must be allowed *Food*.

Pigeons are great lovers of *Salt*, so that it is very good to set a large *Salt-pot* in your *Dove-House*, that is, temper up some *Loom* and *Salt* together in a Pot, and the *Pigeons* will feed thereon with great delight, and occasion them not to forsake your *Dove-House*.

Assafœtida being boyld in Water, and the *Holes* of the *Dove-House* washed therewith, will cause a scent to be on their *Feathers*, so that what company they light into, by their pleasing Scent they will draw home with them.

Cumin Seeds boyled in Water and applyed as aforesaid, will do the same, being an excellent drawer.

But that which is adjudged the most effectual (were it lawful) is a *Salt* or proud *Bitch* baked or roasted with *Cumin-seeds*, and set in the *Dove-House*.

Of BEES, and how to order them.

There is no Creature so industrious, and taketh such great pains as the *Bee*, going out early and coming Home late, never resting but in cold and wet Weather; for Idleness is so detestable a Vice amongst them, that none are tollerated thereunto but their Sovereign, every one being employed either abroad in gathering *Food*, or at Home in building *Combs*, feeding their Young, or some other employ; and no Creatures live together in that unity and amity in one House or Habitation, as having no single propriety in any thing they get or do, all being as it were in common amongst them; nor is their Labour compulsive, but every one endeavours to outvie the other in their industrious Labours.

There is nothing more advantageous to be kept than an *Apiary*, and there must be a convenient, and necessary place made choise of for that purpose, which should be square, or rather more long than broad, and extending from *East* to *West*, and facing the *South*, to the end that the *Bees* returning late Home at Night may the better see their way in. But some are of another opinion, and that is, to let them have the benefit of the Morning Sun, as much as possible, that time being the best to gather *Honey*; but the surest way is to let them have as much of both Morning and Evening *Sun* as the place will admit of; for the Morning *Sun* makes them swarm early in the *Day*. Let the *Apiary* be well defended from high Winds, especially towards the *North*; but let not the Fences, be so high as to hinder the *Sun*, nor so near as to obstruct their Flight; also let it be remote from ill Smells, and not frequented by *Poultrey*: Let the Ground be kept mowed, not digged or pared if it be Grass, for in the Summer it will be too hot, and in the Winter too cold; and let it not be too remote from the *House*, that you may be often with them at Swarning time, or upon several other occasions. Likewise it would be very necessary to plant at some reasonable distance from the *Bees*, *Fruit-trees*, that they may pitch upon the *Boughs* in Swarming-time near at hand.

The usual way to set the Stocks of *Bees* upon, are *Stools*, *Benches*, or *Seats*.

The *Stools* are placed at different Heights, but about a Foot is well. They must be set shelving that the *Rain* may run off, and made two or three Inches wider than the *Hives*, with a place before for the *Bees* to light upon. They may be made of *Wood*, or *Stone*, but *Stone* is not so good, as being too hot in Summer, and too cold in the Winter. The *Stools* ought to stand about five *Foot* one from another; in a strait Rank from *East* to *West*; and if they are placed one behind another, they should be eight or nine *Foot* asunder, and the *Stools* of the one Rank to be placed against the open places of the other, and free from all incumbrances to hinder their Flight.

Benches are the most common in use, and known to every one; but they are nothing near so commodious as *Stools*, being subject to divers inconveniencies.

Seats are esteemed the best, for every Stock of *Bees* make a small House of about two *Foot* Square, and something higher, which should be placed upon four Legs about a *Foot* above Ground, and covered with *Boards* or *Tyles*, to cast off the *Rain*, with the North side closed up, the East and West sides to be made with *Dores* to open and shut at pleasure; and the fore part or South side to have a falling *Dore* to cover the one half thereof, which is to be raised up as occasion requires: and it likewise serves in the Summer Season as a *Pent House* to shelter them from the extream Heat in the mid part of the Day, which is apt to melt their *Honey*.

On these *Seats* may be placed any sort of *Hive*, whether of *Straw*, *Board*, or *Glass*, which will preserve them to a longer continuance than if placed on *Stools* or *Benches*.

Although in some Winter days the Sun shines seemingly warm and comfortable, yet it is not convenient to open the *Doors* to let them out, neither too early in the Spring, before they can find employment for gathering of *Honey*.

The most usual *Hives* are the *Straw*; but of late there is a new invented one of Wood made in Squares, and so ordered to be one Story above the other; I cannot say much in praise or dispraise of it; but the Invention did not much take, the chief design being to preserve the *Stocks* of *Bees*, and yet take the *Honey*, which by the common way are smothered.

Glass-Hives suit the disposition and nature of the *Bee*, who delights to see their workmanship go forward, insomuch that by Observation they will be more laborious, as it were endeavouring to out-do one another in their diligence. Also these sorts of *Hives* afford great delight to the curious by seeing how they work, and order their affairs to wonderful admiration.

For the dressing the new *Hives*, the inside must be very smooth, and free from *Straws* and *Sticks*, which much offends them. As for the rubing them with sweet *Herbs*, and splending them, (that is setting up the Sticks) it is common and well known to most Countrey People, so that I shall pass that by.

If you would have your *Stocks* to encrease, make your *Hives* smaller; and if your design be to have good quantity of *Honey*, make them larger; for a few *Hives* well ordered and in a thriving condition, will afford *Bees* enough to Stock many of the larger *Hives*.

As for the Swarming, if the Spring be dry, cold and windy, it will much retard their Swarming, nor will there be many that Year; but if it be mild and calm with gentle Showers, they will Swarm early and the oftner; about mid *May* in an early and kindly Spring they may begin, and then comes in your care to look after them; but you may have timely notice of their Swarming by observing these Signs. They will hover about the Doors in cold Evenings and Mornings, and in sultry hot Mornings, and Evenings they will hang out; they will run hastily up and down, cast out their *Drones*, and there will be a moistness upon the Stool. Also if the Weather be hot and gloomy, and after a Shower or gloomy Cloud hath sent them home, and that they hang out together, then expect a suddain Swarming.

But on the contrary, if they continually lye forth, especially about mid *June*, 'tis a Sign of their not *Swarming*; Also much stormy and windy Weather obstructs their *Swarming*, although they are ready, and causeth them to lye out; the like doth Weather that hath been very hot and dry, for some continuance.

Now for the causing them to Swarm, keep the *Hives* as cool as possible, by watering the Ground near them, by shading the *Hives*, by enlarging the *Doors* to give them Air, and by forcing them into the *Hives* gently with a *Brush*, suffering them not to cluster together.

As concerning the Signs of *After-swarming*, there is more certainty to be observed; for when the *Prime Swarm* is gone, about nine or ten Evenings after, when another Brood is ready, the *Hive* being overcharged with them, the next *Prince* begins to *tune* in a *treble voyce*, and in a day or two after the *old Queen* will make her reply in a *base Note*, as it were declaring her consent for their *Swarming*. In the Morning before they Swarm they come down near the Stool, and there call some what longer, and at the time of their *Swarming* they come down to the Stool, and beginning their *Notes* more thicker and shrillet, they all come forth in great hast.

If the *Prime Swarm* be broken, the second will both call and swarm the sooner, probably the next day, and after that a third, and sometimes a fourth, and all within a Fortnights Space.

Sometimes a *Swarm* will cast another that Year; but if late, 'tis not worth the keeping, according to the old *Rhime*,

A Swarm in July,
Is not worth a Fly.

It is customary when *Bees* Swarm, to make a tinkling Noyse upon a *Bason*, *Kettle*, *Pan* or the like, thereby the better to gather them to settle; but by the Judicious and such as have made trials concerning the same, 'tis found very idle and foolish, rather causing them to fly away; for all great Noyses are offensive to them; therefore your business should be only to watch their setling, and if they fly aloft and are like to be gone, then cast up Dust amongst them to make them come down.

The *Swarm* being setled, as it were like a Cluster of *Grapes*, and the Hive well rub'd with sweet *Herbs*, &c. shake them off the *Bough* into the *Hive*, which should be of a fit Size answerable to the bigness of the *Swarm* to fill it that Year; and having a *Sheet*, or such like *Cloth* spread upon the Ground, set the *Hive* thereon, for some time, until the *Bees* are setled therein; or if the the *Bough* is small on which they Swarm, you may cut it off, and put it into the *Hive* under the *Sheet*, as aforesaid.

If the *Swarm* separate, and light in two places, but in sight of one another, disturb the lesser parcel, and they will fly to the rest; but if not in sight, then *Hive* them in two *Hives*; then bring them together, and shake the *Bees* out of one of the *Hives* on the *Sheet* whereon the other *Hive* stands, and place the other *Hive* on them, and they will take to it.

When *Swarms* come late, and are but small, 'tis convenient to unite them, by which means they will be more industrious in their labour. The manner of uniting them is thus; Place the *Hive*, whereing you have newly put your *Swarm* you intend to drive into another, in a place that the Skirts may be uppermost, and set the other upon him, binding them about the Skirts with a long *Towel*, and so let them stand until Morning, and the *Bees* will all ascend, that you may the next Morning set the Receiver on a *Stool*, and after this manner you may put two or three Swarms together; but be sure to unite them the same Evening, or the next at furthest that they Swarm.

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For preſerving your ſelf from ſtinging in the time of *Swarming*, the beſt and ſureſt way is to be provided with a *Net* made of fine *Thread* or *Silk*, with a cloſe *Meſh*, which caſt over your Head, Hat and all, compaſſing your Face; and for your Hands have on Gloves. And if notwithſtanding you happen to be ſtung, pull out the Sting as ſoon as poſſible, and for the aſſwaging the ſwelling, heat a piece of Iron red hot, and hold it as near to the place grieved as poſſible, and for as long a continuance as you can endure it, and it will attract out that fiery Venom cauſed by the Sting. But the moſt common way is to rub the Wound with the leaves of *Houſe-leek*, *Mallows*, *Mary-golds*, *Rue*, *Hollyhock* and *Vinegar*, or *Salt* and *Vinegar*; but none of theſe are ſo good.

As ſoon as a *Swarm* hath entred the *Hive*, they loſe no time, but begin to work and gather *Wax* for the building their *Combs*, ſo that it is a Sight worthy to be ſeen to obſerve how theſe poor Creaturs frame their curious Workmanſhip; which may be done, if put into tranſparent or *Glaſs Hives*, or in Wooden *Hives* that have *Glaſs Windows*.

The beſt Seaſon to remove an old Stock of *Bees*, is about *Michaelmaſs*, that is, a little before and a little after; alſo about the end of *February*, or begining of *March* at the lateſt. Let the time be in the Evening, when all the *Bees* are quiet, and when the Weather is fair. The *Hive* muſt be put on a Board, and gently carried to the place where it is to be ſet, for jogging Spoyls the *Hive*, looſning the *Combs*, and diſturbing the *Bees*.

It oft times happens, that through a cold, dry and unſeaſonable Spring, as alſo by a cold and early Winter, that *Bees* will not have a Stock of *Honey* ſufficient to keep them.

In this caſe they muſt be fed, and the beſt Food is *Honey* mixt with ſweet *Wort*, which muſt be conveyed into the *Hives* by ſmall *Canes* or *Troughs* dayly, until the approaching Summer affords them proviſion abroad. Inſtead of *Honey* you may give them *Sugar*. Some gives them *Toaſts* of Bread ſopt in *Ale*; others dry Meal, or Flower of *Beans*.

There are ſeveral things very offenſive and injurious to *Bees*, as *Smoak*, ill *Scents* and *Smells*, *Noyſe*, ill Weather, as *Winds*, *Cold*, *Heat*, and *Rain*, which may be prevented by well placing the *Apiary*: Noyſom Creatures, as *Spiders*, *Snails*, *Frogs*, *Toads*, *Moths*, &c. and devouring *Creaturs* and *Inſects*, as *Birds*, *Mice*, *Waſps*, and *Hornets* are alſo injurious to them.

CHAP. XIII.

Of External Injuries amongſt Cattle, and other Inconveniencies that happen to the Husbandman, with Remedies for the ſame.

Injuries ſuſtained by Beaſts and Vermine.

FOXES are found very pernitious in killing and taking away *Geeſe*, *Poultrey*, and oft times young *Lambs*, eſpecially near *Woods* and *Foreſts*; ſo that ſuch things can hardly eſcape them.

Now for the taking this ſubtile Creature divers Inventions are uſed, as by *Traps*, *Gins*, *Snares*, &c. as well as by *Dogs*, which having treated thereof in *Hunting*, I ſhall omit it here.

POLE-CATS, *FITCHETS*, *WEASELS*, and the like Vermin, are great Enemies to the *Hen-Rooſts*, *Dove-Houſe*, and *Warren*; for taking and deſtroying of all which ſufficient Directions are given in the XIX. Chapter in *Hunting*.

RATS and *MICE* are great Enemies, not only in the *Houſes*, *Granaries*, *Barns*, and *Stables*; but alſo in the *Gardens*, *Orchards*, and *Fields*.

For deſtroying them within-Doors, *Traps* are very good; alſo Baits of *Arſenick*, or the *Roots* of white *Hellebore*, mixt with *Sugar*, and laid in their Holes or Haunts are very good; but that which is more effectual, ſeldom or never failing, is white *Arſnick* beaten to fine Powder, which uſe as followeth: Take *Rayſons* of the *Sun*, ſplit and dip them in the *Arſnick*, and ſo cloſe them again. Alſo, Take *Apples* Codled, and the ſoft *Pap* mix with the *Arſnick* together with *Sugar*: Likewiſe, Take ſome *Hogs-Lard*, *Flower* of *Malt* and *Arſnick* mixt together; to each of theſe three things put a little quantity into an *Oyſter-ſhell*, lay them in ſuch places where the *Rats* come, and it will certainly deſtroy them.

For deſtroying *Field-Mice*, ſo injurious to *Gardens* in eating and ſpoiling the *Wall-Fruit*, as alſo the *Beans*, *Peaſe*, and the like, obſerve theſe Directions: Get a piece of a *Deal-Board*, which cut into thin ſlices, make them pretty ſmooth; then cut twenty pieces ſix *Inches* long, and as many three *Inches* long, and as many two *Inches* long; then cut a Notch in the ſide of that piece ſix *Inches* long, about two *Inches* from the end, and a croſs Notch upon the flat ſide within half an *Inch* of the end; then the other of two *Inches*, to cut it taper at one end, and a croſs Notch on the Flat ſide made within half an *Inch* of the end; then the Stick that is two *Inches* and an half muſt be taper at one end, that ſo the croſs Notch may in the Stick of two *Inches* reſt upon the top of the two

two *Inches* and an half; and then the two *Inches* muſt at the Taper end go into the Stick that is ſix *Inches*, and the Notch of the ſide will be a ſtay to hold up the *Tiles*; then take forty *Tiles*, and they will ſerve for the twenty *Traps*, and fit them as near as you can to fall cloſe together; Then take the three *Sticks*, the ſix *Inch*, the three and the two *Inch* Sticks, and place the three *Inch* Stick to the edge of the undermoſt bottom *Tile*; then take the two *Inch* Stick, and place the Notch of it upon the Taper end of the three Notch Stick; then take the ſix *Inch* Stick, and ſet the Taper end of the two *Inch* Stick in the Notch that is at the end of the ſix *Inch* Stick; then the Notch of the ſide of the ſix *Inches* muſt hook into the ſide of the three *Inch* Stick, otherwiſe the weight of the *Tile* will make the Sticks fly all apart; if it ſtand when it is ſet exactly like a Figure of 4, you ſhall ſee every part in the Frontice-piece. You muſt bait the end of the ſix *Inch* Stick with *Lard*, and dip it into *Oatmeal*, and bait but the uppermoſt ſide; then having ſet them all along the *Hedges*, or *Wall-ſides*, you will find good ſtore taken of them, for the *Traps* ſeldom miſs: And in thoſe *Traps* where *Mice* are taken, when you ſet them again, you ſhould Bait them afreſh with *Lard* and *Oatmeal*, as aforeſaid.

Theſe *Traps* are very good to take *Titmice*, which is a very deſtructive Bird to the Buds of *Trees*, as alſo to *Wall-Fruit*.

MOLES, or *WANTS*, are great Enemies to *Gardens*, *Meadows*, and *Corn-fields*; they are to be taken with *Traps*, which are to be placed in the *Mole's Road*, *Paſſage*, or *Trench*; and of theſe *Traps* there are ſeveral ſorts, but the beſt is thus made: Take a piece of *Board* about three *Inches* broad, and five *Inches* long, with the ends made Taperwiſe; on one ſide fix two ſmall Sticks like round *Arches*, at each end one, large enough for a *Mole* to go through; in the midſt of the *Board* make a Hole large enough to receive a *Gooſe-Quill*, into which a Peg of about two *Inches* long is to be put. You muſt alſo be provided with a *Hazle* Stick, or ſome other bending *Wood* of about a *Yard* and an half long, which is to be ſtuck in the Ground with a Link of *Horſe-hair* tyed to it; and before you fix the *Trap* into the *Moles Paſſage*, put the *Hair-Spring* through the Hole in the midſt of the *Board*, and place it round even with the *Hoops*, and with the ſaid *Peg* (gently put into the Hole to ſtop the Knot of the *Hair-Spring*;) then make the *Trap* faſt down by hooked long Sticks thruſt into the Earth, to the end that the *Spring-Stick* may not draw up the *Trap*; and the *Trap* muſt be exactly covered over with Earth, that there may be no Light appear in the ſaid *Trench*; And when the *Mole* paſſeth that way, by thruſting out the ſaid *Peg* that hangs looſly perpendicular downwards, and the *Knot* paſſing through the *Hole*, the *Mole* is become enſnared with the *Spring*.

After this Method you may ſet what quantity of *Traps* your Ground requires, which ſhould be tended every day Morning and Evening at their Working times, to ſee what are taken, and that the *Traps* may be ſet again, for in one Paſſage ſeven or eight may be taken without removing the *Trap*.

Another way to take Moles.

HAving taken a *Doe-Mole*, get a large *Earthen Pot*, and having made a Hole in the middle of the main *Trench*, or *Paſſage*; ſet the *Pot* that the top may be even with the bottom of the *Trench*; then fill it about half full with *Mould*, and put ſome great *Worms* therein for the *Mole* to live upon, and cover the *Pot* very cloſe that no Light come therein; and the *Buck-Mole* will not fail to viſit the *Doe* in the *Pot*, eſpecially if it be ſet about *March*, which is their *Bucking-time*; for then 'tis ſaid they will run about a quarter of a *Mile* after a *Doe*, and by this means (with the help of a few *Pots*) all the *Bucks* will be taken.

If you Fume the *Trenches* with *Brimſtone*, *Garlick*, and the like unſavoury things, the *Moles* will forſake the Ground. The like they will do, if you put a dead *Mole* into their *Trenches*.

The uſual places for their *Beds* and *Haunts*, are in *Banks*, and near *Hedge-rows*.

Mole-Ketchers are very expert in taking them in the Mornings and Evenings, when they ſtir, only with their *Paddle-Staves*.

Injurious Fowl and Inſects.

THe *Crows*, *Rooks*, and *Daws*; as alſo *Sparrows*, *Titmice*, *Bulfinches*, and the like ſmall *Birds*, deſtroy much *Corn*, as alſo *Cherries*; the like do *Jayes* and *Magpies*. There are divers Inventions to deſtroy them, which are taken notice of in the Treatiſe of *Fowling*.

Kites and wild *Hawks* oft-times kill the *Chickens*.

Snails, *Slugs*, *Waſps*, *Ants*, *Hornets*, *Ear-wigs*, *Caterpillars*, *Ants*, *Snakes*, and the like, are alſo very pernicious to the Husbandman; but they may eaſily be deſtroyed with a little care and pains.

Injuries ſuſtained by the Heavens.

HIgh *Winds* are very pernicious to *Fruits*, *Trees*, *Corn*, *Hops*, *Buildings*, &c. eſpecially in plain, open, and high Countries; for a defence from which, the *Elm* (or other high Trees) is a great ſhelter to *Houſes*; and for *Fruits* and *Hops* good *Walls*, *Pales*, and *Hedges*, are a Preſervative; and for *Corn*, there is no better way than good *Hedge-Rows* and *Incloſures*, as before treated of.

Thunder, *Tempeſts*, *Hail* and *Lightning* are great enemies to the *Husbandman* in divers reſpects, which being ſo well known are unneceſſary to be named.

Blighting and *Mildews* prove oft times fatal to *Corn*; but if a good Shower of *Rain* immediately follows, or that the Wind blow ſtiffly, it waſheth or ſhaketh it off. But this Ill-conveniency doth moſt attend *Incloſures*. Alſo the Sowing of *Wheat* early is a great prevention of *Mildews*: And

Bearded

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Bearded Wheat is not subject thereto, as other sorts are.

Great and hasty *Rains* are very pernicious to *Corn*-Ground, especially to such that lye low, and at the bottom of *Hills*, for which it is good to make *Water-Courses*, or *Drains*, to carry it away: And a wet *Harvest* is very bad, not only as to Expences, but as to the spoyling the *Corn*, which the better to prevent observe the old Proverb, *To make Hay whilst the Sun shines.* And let the *Corn* be well shock'd up, which will very much preserve it from a Shower of *Rain*.

Violent and long *Frosts* are very prejudicial in several respects, especially to forward *Fruits*, *Seeds*, and *Plants* in the Spring. Also some *Lands* (as cold Clayey Ground) are more subject to suffer by bitter *Frosts*, than those that lye on a warm *Sand*, or *Gravel*; also those that lye moist, more than those that lye dry; and those that lye on the North and East sides of *Hills*, more than those that lye on the South and West. And as a Remedy for this, *Inclosures* are very good, being a great preservative to *Corn*, *Trees*, *Plants*, &c.

Also *Horse-Dung* laid to the *Roots* of young and tender *Trees*, and *Plants*, is a great preservative against pinching *Frosts*. Likewise *Straw*, *Haum*, *Fern*, or *Furz*, will very much defend any thing from *Frosts*. Also *Mat*, or *Canvass*, is very good to preserve *Beds* of tender *Plants*, or *Flowers*, being arched over with Sticks, and the said *Mat*, or *Canvass*, laid upon it. The like it is for *Hot-Beds*, for the raising of *Seeds* in the Spring.

Fruit gathered into the House is subject to great damage by *Frosts*, so that to prevent this mischief in a great measure cast *Straw* over them.

This Kingdom is much subject to *Heat* and *Drought* in the Summer Season, so that to many *Seats* Water is much wanting, all standing *Pools* being then dryed up, insomuch that *Cattle* are drove to Water a considerable distance to some *Spring* or *River*; and no *Water* for the Houshold Affairs, but what is brought by a *Cart*, which is very troublesom. Now to prevent this, where no *Springs* can be found by digging of *Wells*, make *Cisterns* which may be capacious enough to hold as great a quantity of Water as you think fit, which will easily be filled, be it never so big in the Winter.

For the making these *Cisterns*, make a Bed of good *Clay*, and lay thereon *Bricks* for the *Floor*; then raise the *Wall* round about, leaving a convenient space betwixt the *Bricks* and the *Earth*, to ram in *Clay* as fast as the *Wall* is made; but be sure let the Bed of *Clay* be of a good thickness, and well tempered, that the *Clay* chop not, for then it is spoiled, and will not hold Water.

CHAP. XIV.

A KALENDAR, *or Monthly Directions to the Husbandman.*

THere is a peculiar time to be observed for the most Affairs in the World, but especially for such that depend upon the mutable Seasons of the Year, being the essential part of *AGRICULTURE*, insomuch that every *Husbandman* should have his *Chart*, or *Draught*, to steer by, and to reinforce his Memory, so that the multiplicity of his Affairs may not occasion his forgetting those things that are necessary to be undertaken, always observing the Proverb, *To take Time by the Fore-lock*, for Time let slip can't be recalled, so that it is a great negligence to be too late; and you shall rarely find a thriving *HUSBANDMAN* to be behind with his Affairs, for if you expect a Reward of your Labours, *Plow*, *Sow*, and *Reap* in due Season. But to proceed to the *Monthly Kalendar*, beginning with *January*.

	Sun-Rise. H.	M.	Sun-Set H.	M.	JANUARY 31 Days.
1	*New-Tears*				
2	*Day.*				
3					
4	8.	00	4.	00	*Castor* and *Pollux* riseth in the Evening.
5					
6	*Twelf-day.*				
7					
8					
9					
10	*Sun* in *A-*				*Lucida Corona*, or the
11	*quarius.*				*Crown*, is with the *Sun.*
12					The *Dog-Star* riseth in the
13					Evening.
14					
15					
16	7.	45	4.	15	
17					
18					
19					
20					
21					
22					
23					
24	7.	30	4.	30	
25	St. *Paul.*				
26					
27					
28					
29					
30					
31	7.	15	4.	45	

A Frosty *January* is seasonable, although it proves the Rich mans charge, and the Poor mans misery.

Now it is time to Plow, or Fallow the Ground designed for *Peafe*, *Beans*, or *Oats*; and if the Weather be Mild, sow forward *Peafe*, and set *Garden-Beans*, digging or trenching your Garden Ground, to make it mellow for your Crop in the Spring, if your time did not permit you in *December*.

Now it is good time to water *Meadows*, and *Marsh Grounds*, and to drain *Arable Lands* by cutting *Water-Furrows*.

If the Season be Hard and Frosty, carry out your *Dung* on your *Land*, laying it on Heaps until the Weather be mild and open.

Lop and Top *Trees*, and cut your *Coppices* and *Hedge-rows*.

In open Weather remove and plant *Trees* and *Vines*, dig and trench *Gardens*, lay up your *Borders*, uncover the Roots of such *Trees* that require it, putting Soil unto them. Also Prune your *Vines* and *Trees*, Nail and trim *Wall-Fruits*, cleanse *Trees* from *Moss* and *Succors*, gather *Cions* for *Grafts*, and stick them in the Ground until Grafting time. Make *Hot-Beds*, and Sow your choice *Sallads*, also *Colly-flowers*, &c. secure your choice *Flowers* and *Plants* from the Cold by *Covers*, *Straw*, or *Dung*. Earth up the Roots of such *Plants* that the Frost hath uncovered. Set *Quickfets*. *Hedge* and *Ditch*; Cut away *Ant-hills*. House your weanling *Calves* and *Colts*. Be careful of your *Ews* and *Lambs*. Set *Traps* to destroy *Vermin*. Dig Weedy *Hop-Grounds*, remove *Bees*, and turn up *Bee-Hives*, and sprinkle them with sweet warm Wort.

	Sun-Rise. H.	M.	Sun-Set H.	M.	FEBRUARY 28, or 29 Days.
1					*Cor Leonis* riseth in the
2	*Candlemass*				Evening.
3					
4					
5					
6					
7					
8	7.	00	5.	00	*Sun* in *Pisces.*
9					
10					
11					
12					
13					
14	*Valentine*				
15					
16	6.	45	5.	45	*Cor Hydræ* riseth in the
17					Evening
18					The *Lions Tail* riseth in
19					the Evening.
20					*Fomahant* is with the *Sun.*
21					
22					
23	6.	30	5.	30	
24	*Matthias*				
25					
26					
27					
28					
29					

This is a busie Month for sowing of *Peafe*, *Beans*, *Tares*, and *Oats*, being the principal Season for *Lenten Grain*. Carry out *Dung*, and spread it before the *Plough*; but for Pasture Grounds that are wet, chuse the hard *Frosts*. Make hast to Plant such *Trees* that your occasions would not permit you in *January*, for now the *Sap* riseth up, and then it is too late: You may also yet plant *Quick-sets*. Set *Osiers*, *Poplars*, *Willows*, and other *Aquaticks*, this being a very good Season. If the Season is mild sow *Hemp-seed*, as also *Mustard-seed*. Cleanse your Ground from *Moles* before breeding time, which is in *March*, and spread the *Mole-hills*. This is seasonable for cutting *Coppices*, Lopping of *Trees* and plashing of *Quick-sets*. If the Weather is temperate Graft your forward *Fruits*, and cleanse *Fruit-Trees* from *Moss* and *Cankers*. Cut not your tender *Wall-Fruit* until the *Frosts* are over. Trim up your *Pallisade-Hedges* and *Espaliers*. Lay *Branches* to take Root. Set *Nuts*, *Fruit-Stones*, and *Kernels*, with other hard *Seeds*. Towards the middle, or latter end of the Month sow *Carots*, *Parsnips*, *Onions*, *Sallating*, *Parsly*, *Spinage*, and other hard *Seeds*; plant *Cabages*, *Liquorice*; plant out *Colly-flowers* into Warm-Beds. Make up *Hot-Beds* for *Cucumbers*, *Melons*, &c. Sow *Asparagus*. Gather off the *Snails* from the *Wall-fruit*, set *Traps* for taking *Bull-finches* that destroy the *Buds* of *Fruit-Trees*. Plant *Hops* if the Weather be mild, and dress them that are out of heart. You may yet remove *Bees*, and half open their Passages. This Month is good to sew *Fish-Ponds*, and to take *Fish*.

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	Sun-Rise. H.	M.	Sun-Set H.	M.	MARCH 31 Days.
1	*David*				
2	6.	15	5.	45	
3					
4					
5					
6					
7					
8					
9					
10	6.	00	6.	00	*Sun in Aries. Æquinoctial.*
11					
12					*Arcturus* riseth in the Evening.
13					
14					
15					
16					
17					
18	5.	45	6.	15	*Calf* of the right Leg of *Bootes* riseth in the Evening.
19					
20					
21					
22					
23					*Spica Virginis* rises in the Evening.
24					
25	5.	30	6.	30	*Lady Day.*
26					
27					
28					
29					*Second Star* in the Left Wing of *Virgo* riseth in the Evening.
30					
31					

	Sun-Rise. H.	M.	Sun-Set H.	M.	APRIL 30 Days.
1					
2	5.	15	6.	45	
3					
4					
5					
6					
7					
8					
9	5.	00	7.	00	
10	*Sun in Taurus.*				
11					
12					*Cauda Leonis* Sets in the Morning.
13					
14					
15					
16					
17	4.	45	7.	15	
18					
19					
20					
21					
22					
23	St. *George.*				
24					
25	St. *Mark.*				
26	4.	30	7.	30	*Virgiliæ*, or the *Pleiades*, rises with the *Sun.*
27					
28					
29					
30					

This Month ushers in the welcom *Spring*, and if it prove dry, is esteemed ominous of a happy year for Corn. In this Month and the next sow all sorts of *French Grasses*, or *Hay-seed*, and if the Weather be temperate *Flax* and *Hemp*. It is also the principal Season for *Oats*, *Barley*, *Pease*, &c. Also sow *Carots*, *Parsnips*, *Turnips*, *Cabage-seeds*, *Parsley*, *Skirrets*, *Onions*, *Leeks*, *Garlick*, *Spinage*, *Purslaine*, *Lettuce*, *Raddish*, *Sallery*, *Smallage*, *Endive*, *Succory*, *Marygolds*, with divers other Summer Herbs. You may transplant most sorts of *sweet Herbs*, and *Summer Flowers*. Make your *Hot Beds* for *Melons*, and *Cucumbers*. Dress up and string your *Strawberry-Beds*. Uncover *Asparagus-Beds*, and transplant them. Slip and plant *Artichoaks*, and *Liquorice*. Plant all *Garden-Herbs* and *Flowers* that have *fibrous Roots*. And such choice *Flowers* that are not natural for our Climate sow in *Hot-Beds*. Now is a good time to plant *Madder*, and *Saffron*. As also *Hops*, and to dress them up. Sow *Pine-Kernels*, and the Seeds of all *Winter Greens*: Also *Pinks* and *Carnations*. This is the principal Season for *Grafting* all sorts of *Fruit-Trees*, and cover the *Roots* of such *Trees* that you laid open in the Winter. Carry *Dung* into your *Gardens*, and *Orchards*. Destroy what *Moles* you could not in *February*. It is yet seasonable to set *Osiers*, *Willows*, and the like *Aquaticks*. Lay up your *Meadows* and *Pastures* designed to *Mow*, and keep up your Fences. If the Weather be dry, Rowl your *Wheat*. 'Tis a good Season to Lop *Trees*, and fell *Coppices* And this is the best Season to raise the best Brood *Poultrey*.

If the *Spring* is forward, cleanse and rid away the *Wood* from the *Coppices*, and fence them in to preserve them from *Cattle*. It is now seasonable to Fell such *Timber* you intend to Bark. If the Season is dry *Fallow* your Ground, cleanse and scour your *Ditches*, and make haste to sow your *French Seeds* that you could not do in *March*; and you may also sow *Hemp* and *Flax* in the beginning of this Month. Now is a good Season to sow all *Garden Seeds*, if the Weather is dry: and when it is wet, plant your *Garden Herbs*, and sow such tender *Seeds* that can't endure the cold *Frosts*. Sow *Cucumbers* and *Melons*; set *Artichoaks*, *French-Beans*, and *English-Beans*. In the beginning of this Month Graft some sorts of *Fruit* in the Stock Gather up *Snails* and *Slugs* after Evening Showers, as also early in the Mornings. Sow your *Annual Flowers* that come of Seed, that you may have *Flowers* all the *Summer*: Also sow the *Seeds* of *Winter-Greens*, and transplant such Flowers with *fibrous Roots* that were left unremoved in *March*. You may now set forth your tender *Greens*, that are kept in your Conservatory in the Winter, except *Orange Trees*, and those bring not forth till *May*. Also transplant and remove your *Jasmines*, *Myrtles*, and the like tender Greens: And towards the end of the Month, if the Weather be mild, clip your *Phillyrea*, and transplant any sort of *Winter Greens*. Plant *Hops*, and Pole them. Lay open your *Bees* to gather the Sweets of the *Flowers*.

MAY

	Sun-Rise. H.	M.	Sun-Set. H.	M.	MAY 31 Days.
1	*Phil.* and				
2	*Jacob*				*Cor Scorpionis* Sets in the Morning.
3					The Great *Dog-Star* in the Evening.
4					
5					
6	4.	15	7.	45	
7					
8					
9					The *Goat-Star* appears.
10					
11	*Sun in Gemini*				
12					*Aldebran* Sets in the Evening.
13					
14					*Fomahant* rises in the Morning.
15					
16	4.	00	8.	00	
17					Middle Star of *Andromeda's Girdle* Sets with the *Sun.*
18					
19					
20					
21					
22					*Cor Scorpionis* rises in the Evening.
23					
24					
25					
26	3.	50	8.	10	
27					
28					
29					The *Bulls Eye* rises with the *Sun.*
30					
31					

	Sun-Rise. H.	M.	Sun-Set. H.	M.	JUNE hath 30 Days.
1					
2					
3	3.	45	8.	15	
4					
5					
6					
7					
8					
9					The Head of *Castor* rises in the Morning before the Sun.
10	3.	45	8.	15	
11	*Barnabas*				Sun in *Cancer Solstice.*
12					
13					
14					*Arcturus* sets in the Morning.
15					
16					
17					*Hydra's Heart* sets in the Evening.
18					
19					
20	3.	45	8.	15	
21					
22					
23					
24	*Jo. Baptist*				
25					
26					
27					
28					
29	*St. Peter*				The Right Foot of *Gemini* sets in the Morning.
30	3.	30	8.	10	

This oft proves the pleasantest Month in the Year; the *Fields* and *Trees* being in their Summer *Liveries*, and *Birds* chant out their pleasant *Notes* to the welcoming in the *Spring*.

If this Month proves seasonable and cool, it rejoyceth the Countrymans Heart in expectation of a happy *Autumn*; but if hot, it denotes *Sickness* to ensue. If your *Corn* be too rank, Mow it, or Feed it down, with *Sheep*.

It is a good time to wean *Lambs*, whose *Ewes* you intend to milk. Cutting or Cropping of *Trees*, hinders them from thriving.

You may sow *Buck-Wheat* this Month, as also later *Pease*, and set later *Garden Beans*. Weed your *Quick-Sets*. Drain Wet and Marshy Grounds.

Turn out your weanling *Calves* to Grass. *Twi-fallow* your Ground, get home your *Fewel*, cleanse your Ground from *Broom*, *Furz*, *Gass*, and the like: and grub up such *Coppices* and *Hedgrows* as you intend should not grow again. Sell off your Winter-fed *Cattle*, look after your *Sheep* if the Weather proves rainy, for fear of the Rot.

About the end of the Month Mow your *Clover*, St. *Foyn*, and other *French Grasses*. Plant all sorts of *Winter Greens*.

Sow sweet *Marjarom*, *Thime*, *Basil*, hot Aromatick *Herbs*, and *Plants*, and such like tender *Seeds*. Also set *Sage* and *Rosemary*. Sow *Purcelain*, and *Lettuce*; also *French Beans*; and uncover your *Melons* and *Cucumbers*, excepting in *Glasses*.

Take up such *Tulips* that are dryed in the Stalk. Watch your *Bees* ready to swarm, and bind up the *Hops* to the *Poles*, and make up the *Hills* after Rain.

This Month is the principal Season for washing and sharing *Sheep*: And now begins the Husbandmans *Hay-Harvest* in high forward *Meadows*. *Fallow* your Wheat-land, which will kill the Weeds, and mellow the Ground. And cleanse and scower your *Ponds* and *Ditches* from the Mud, the Season being now warm to endure the Water. Fetch home your Fewel before your Teem is employed in *Harvest affairs*. *Weed* your *Corn*, sow *Rape*, and *Cole-seed*, as also *Turnep-seed*. Have a great care to your *Sheep* for fear of the Rot, for *Mildews*, and *Honey-dews* begin to fall. Gather *Snails*, *Slugs*, and *Worms*, and destroy *Ants* and other Vermin. 'Tis a good time now to *Inoculate*, and to pluck off the *Buds* where you would not have the *Trees* branch forth. Water such *Trees* that you planted late, laying *Weeds* or *Stones* at the Roots to keep them moist. Plant *July-Flowers*, and *Rosemary*, set *Saffron*, sow latter *Sallading*. Inoculate *Jasamine*, *Roses*, &c. gather *Seeds* that are ripe, and preserve them that are cool and dry. Water the dry *Beds*. Take up your *Bulbous* Roots of *Tulips*, *Anemonies*, &c. and transplant them. Dig such Ground as you design for a *Hop-ground*, and bind such *Hops* to the *Poles* that the Wind hath shaken off. Be careful of yours *Bees*, this Month being the principal time of their swarming. And now is the time to distil Waters, to dry *Herbs* for the Winter, and to make *Syrups*, &c.

JULY

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	Sun-Rise H.	M	Sun-Set H.	M	JULY 31 Days.
1					First Star of *Orions Belt* rises with the *Sun*.
2					
3	Visitation of *Mary*.				
4					
5					
6					
7					
8	4.	00	8.	00	
9					
10					
11					
12					
13	Sun in *Leo*				*Lucida Corona* rises in the Evening.
14					
15	St. *Swithin*				
16					
17					
18	4.	15	7.	45	
19	Dog Days.				
20	*Margaret.*				Lesser *Dog-Star* rises with the *Sun*.
21					
22	*Mary Mag.*				
23					
24					
25	St. *James.*				
26					
27					
28	4.	30	7.	30	Greater *Dog-Star* rises with the *Sun*.
29					
30					
31					*Syrius* rises in the Morning.

This Month and *August* is the Husbandmans busy time, *Hay Harvest* admitting no delay, especially if fair Weather offers.

Gather your earliest *Hemp* and *Flax*.

Sow *Turnep-Seeds:* Towards the latter end of this Month, your *Rye* will be ripe, especially if the Year is forward.

In this Month *Wheat* and *Hops* are much subject to *Mildews*.

It is now very good time to Inoculate choise *Fruits*, *Roses*, &c.

Cut off the Stocks of such *Flowers* that have done blossoming, and cover their Roots with new rich Mould.

Cleanse your *Wall Fruit* from *Snails*.

Sow latter *Sallading*. Slip Stocks, and lay *July-Flowers* and *Carnations* for encrease, watering them, and keeping them from the heat of the *Sun*; also lay *Myrtle* and other curious Greens.

Graft by approach, and *Inoculate Jasmines*, *Oranges*, &c. Transplant and remove *Tulips*, and the like Bulbous Roots.

Streighten the entrance of your *Bees*, kill the *Drones*, *Wasps*, *Flyes*, &c. that annoy them.

	Sun-Rise H.	M	Sun-Set H.	M	AUGUST 31 Days.
1	*Lammas* Day.				*Orion* appears in the Morning.
2					
3					
4					
5					
6	4.	45	7.	15	
7					
8					
9					*Cor Leonis* rises in the Morning with the *Sun*.
10	*Laurence.*				
11					
12					
13	5.	00	7.	00	*Sun* in *Virgo*.
14					
15					
16					
17					
18					
19					
20					
21	5.	15	6.	45	
22					
23					
24	St. *Bartholomew.*				
25					*Cauda Leonis* rises in the Morning with the *Sun*.
26	(end.				
27	*Dog Days*				
28	5.	30	6.	30	
29					
30					
31					

This Month is the *Husbandmans* great expence for the bringing in of his *Harvest*; and if it prove dry and free from high Winds, great part of his disbursments will be abated to Labourers; besides, the great advantage gained by having the *Corn* dry cut and housed. You may yet *Twy-fallow*, and carry on your *Dung* for your Winter *Corn*, laying it in heaps to be spread before the *Plough*. This is a good Season for gelding of *Lambs*; and such *Ewes* and *Cows* that you design not to keep for store, put to fatting. About the end of this Month you may Mow your *Rowen*, or *After-Marth* Grass, also your *Clover*, and other French *Grasses* will be fit to cut again. This is a good Month to make *Cider* of *Summer Fruits* that will not keep. The beginning of this Month is very good to *Inoculate* in, and to unbind the *Buds* of those before *Inoculated*, if taken Sap. Pull up the *Suckers* from the Roots of *Trees*, prune away superfluous Branches from your *Wall Fruit-Trees*, but leave not the *Fruit* bare, except the red *Nectorine*, which is much meliorated by its being exposed to the *Sun*. Set Slips of *July-Flowers*; Transplant *Flowers* and Garden *Plants* as *Herbs*, *Strawberrys*, &c. gather Seeds of *Flowers* and *Herbs*. Sow *Cabages*, *Colly-Flowers*, *Turneps*, and other Roots and *Plants* for the Winter, and against the next Spring. Also sow such *Seeds* that will endure the Winter. About *Bartholomew-Tide* is a good Season to transplant all Bulbous Roots; as also *Winter Greens*. Gather *Hops*, look after your *Bees*, and streighten their passages to secure them from *Wasps*, and those that you intend not to keep, destroy for their *Honey*.

	Sun-Rise H.	M	Sun Set. H.	M	SEPTEMBER 30 Days.
1					
2					
3					
4					
5	5.	45	6.	15	
6					
7					
8	Nativity				
9	of Virgin				
10	*Mary.*				
11					*Arcturus* Sets after the *Sun*.
12					
13	6.	00	6.	00	*Sun* in *Lira*, Equinoctial.
14	Holy Cross				
15					
16					
17					
18					
19					
20	6.	15	5.	45	
21	St. *Mathew*				
22					
23					
24					
25					*Spica Virginis* is with the *Sun*.
26					
27	6.	30	5.	30	
28					
29	St. *Michael*				*Plejades* Rises in the Evening.
30					

Gentle Showers are now acceptable for the mellowing the Earth for the *Plough*, the *Wheat-Seed* Season being now; but dry and calm Weather is best for the gathering your *Winter-Fruits* now ripe; for according to Observation, Sow *Wheat* in the Dirt, and *Rye* in the Dust. Geld *Cattle*; put your *Boars* up to fat: Sew your *Fish-ponds*; beat out *Hemp-seed*; and Water your *Hemp*. Gather *Masts*; and put your *Swine* into the *Woods*: Carry out what Dung you have to be spread on your *Wheat-Land* before the *Plough*.

'Tis a good Season to make *Cider* and *Perry* of such *Fruits* that will not keep, or such that are bruised, or the like, in the gathering; but let your long lasting *Winter-Fruit* hang on the *Trees* till *Michaelmass*. Sow *Cabages*, *Colly-Flowers*, *Turnips*, *Onions*, &c. and transplant such *Cabages*, and *Colly-Flowers* that were sown in *August*; also transplant *Asparagus Roots*, *Artichoaks*, and *Strawberries*. Hoe your *Turnips*, plant *Tulips* and other *Bulbous Roots* that you formerly took up; you may also transplant all *Fibrous Roots*. Be careful of your choise *Plants*, and *Winter Greeen*, setting them in your *Conservatory*.

This Month puts an end to your gathering and drying your *Hops*, cleansing the *Poles* from the *Hawm*, and to set them up for the next Year.

Look after your *Bees*, destroy the *Wasps*, &c. streighten the Entrances into their *Hives*, and destroy those that you intend not to keep, taking away their *Honey*.

	Sun-Rise H.	M	Sun-set. H.	M	OCTOBER 31 Days.
1					
2					*Spica Virginis* Rises in the Morning with the *Sun*.
3					
4	6.	45	5.	15	
5					
6					
7					
8					
9					
10					
11					
12	7.	00	5.	00	
13					
14	*Sun in Scorpio*				
15					
16					
17					
18	St. *Luke.*				*Cauda Leonis* sets in the Evening.
19					
20	7.	15	4.	45	
21					
22					
23					
24					
25	*Crispine.*				
26					
27					
28					
29	7.	30	4.	30	
30					
31					

This Month proves generally Windy, and finisheth the Fall of the Leaf.

It is yet a good Seed-time for *Wheat*, and you may sow your *Hotspurs* on rich and warm Ground for a forward Crop.

Lay up your *Barly-Land* dry, *water-furrow*, and drain your new sown *Wheat-Ground*.

The time is seasonable for sowing of *Nuts*, *Acorns*; as also other *Berries*, or *Masts* for *Coppices* or *Hedgrows*.

Plant *Quick-sets*, and plash your *Quick-set Hedges*. You may also begin to set *Trees*.

Wean your *Colts* foaled of your working *Mares* at the Spring, and sell off such Sheep that you design not to keep.

This is a good time for making *Cider* and *Perry* of your *Winter-Fruits*, and finish the gathering of such like *Fruits*.

Sow all sorts of *Fruit-Kernels*, *Stones and Nuts*, as well for *Trees* as *Stocks*. Cut and prune *Rose-Trees*.

Plant your *Bulbous Roots* of any sort, and remove *Flowers* and *Herbs* with *Fibrous Roots*, if the former Season was omitted.

Plant *Hops*, and *bag* up those you dryed the former Month.

'Tis a good Season for removing *Bees*.

Trench the stiffer sorts of Ground for *Orcharding*, and *Gardening* to lye mellow in the Winter; lay open the Roots of old and unthriving *Trees*, or such that spend themselves too much, or too soon in Blossoms.

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	Sun-Rise. H.	M.	Sun-Set H.	M.	NOVEMBER 30 Days.
1					*Alhallon*
2					*day.*
3					
4					
5					
6	7.	45	4.	15	*Leonard.*
7					
8					
9					
10					*Virgiliæ*, or the *Seven Stars*,
11	*Martinmas*				sets in the Morning.
12	*Sun* in *Sa-*				The *Bulls-Eye* sets in the
13	*gitarius.*				Morning.
14					
15					
16	8.	00	4.	00	*Edmund.*
17					
18					
19					
20					
21					
22					
23					*Cor Scorpii* rises in the
24					Morning.
25					
26	8.	10	3.	50	The *Bulls-Eye* rises in the
27					Evening.
28					
29					The middle *Star* of *An-*
30					*dromeda's Girdle* rises in
					the Morning.

Seed-time is now well over, and the *Markets* begin to fill with *Corn*. Fat your *Swine* for slaughter. Cast out your Mushy *Straw* in moist places to rot for *Dung*. Plant *Timber* and *Fruit-Trees*, if the Weather be open. Fell *Coppices*, and Lop *Trees*; break *Flax* and *Hemp*; destroy *Ant-hills*; trench and dig up *Gardens*, and sow forward *Pease*. Furnish your *Nursery* with *Stocks* against the *Spring*. Prune your *Fruit-Trees*, and cleanse them from *Moss*. *Cider* may be made of hard *Fruits*, that are not pulpy. Sow *Nuts* and *Fruit-Stones*. If the Weather is open plant *Tulips*; also *Roses*, and several other *Plants* and *Flowers*; and those *Seedlings*, or *Layers* that are tender, should be covered with *Straw*, *Matresses*, *Boxes*, or the like. Carry *Dung* into your *Hop-Garden* to mix with *Earth* to rot against the *Spring*. Lay up *Parsnips*, *Carots*, *Cabbages*, *Colly-flowers*, &c. either for use, or to transplant for *Seed* at the Spring. Cover your *Asparagus-Beds*, *Artichoaks*, *Strawberries*, and tender Plants with long *Dung*, or *Horse-Litter*, to preserve them from *Frosts*. Now is a good time to dig up *Liquorice*.

	Sun-Rise. H.	M.	Sun-Set H.	M.	DECEMBER 31 Days.
1					
2					
3	8.	15	3.	45	Right Foot of *Gemini* sets
4					in the Morning.
5					The lesser *Dog-Star* sets in
6					the Morning.
7					
8					
9					
10					
11					
12	8.	17	3.	43	*Sun* in *Capricorn* Solstice.
13					
14					*Arcturus* sets in the Even-
15					ing.
16					
17					*Cor Hydræ* sets in the
18					Morning.
19					
20	8.	15	3.	45	
21	*St. Thomas.*				
22					
23					
24					
25	*Christmas.*				Right Shoulder of *Orion*
26	*St. Stephen.*				rises in the Evening.
27	8.	10	3.	50	St. *John* Evangelist.
28	*Innocents.*				
29					
30					
31					The Left Foot of *Gemini*
					rises in the Evening.

Now begins the Country mans chargeable time for Housing his *Cattle*, or foddering them abroad. Lop *Trees*, and fell *Coppices*; plant all sorts of *Trees*, as well *Fruit* as others, provided they are such as shed their Leaves. Let *Horses* Blood; fat *Cattle*, and *Swine*. Destroy *Ant-hills*, overflow *Meadows*, and drain your *Corn-fields* by cutting *Water-furrows*. It is a good time to Plow for *Pease*, or *Beans*. Prune your *Vines*, if the Weather be open. Keep your *Asparagus Beds* covered, as directed in *November*; the like observe for you *Artichoaks*, and *Strawberries*. Trench and dig your *Garden Ground* to Mellow the *Earth* against the Spring; and if the Weather be Mild sow *Pease*, and set *Beans* for forward *Crops*. Set *Traps* for destroying *Vermin*, and pick the *Snails* away from your *Wall-Fruit-Trees*. Dig up *Liquorice*, feed the Stocks of *Bees* that are weak, and cleanse your *Hop-Gardens* from *Weeds*.

OF

OF THE FIGHTING-COCK.

Which treats of the Choise, Ordering, Breeding, and Dieting of Cocks for Battle.

FOR the perfecting of this Work, since many of the *Nobility* and *Gentry* delight in this Noble Diversion, I shall conclude with a compendious *Treatise* thereof.

CHAP. XV.

Of the Choise of Cocks.

THE best properties for the choise of *Fighting Cocks*, is their *Shape*, *Colour*, *Courage*, and *sharp Heels* or *Spurs*; as to their Shape, the middle sized ones are esteemed the best, as being soonest and easiest match't, as also the *Nimblest*, and generally best of Courage; whereas the large ones (called the *Turn-Pock*) is difficult to find his equal; besides they are for the most part heavy, not shewing that sport in their *Battle*: likewise the small sized ones are weak, and tedious in *Battle*.

The Shape.

HE should be of a proud and upright *Shape*, with a small *Head*, a quick large *Eye*, with a strong *Beak*, crook't and big at the setting on, the Beam of his *Legs* very strong, and according to his *Plume*, *Gray*, *Blew*, or *Tellow*; his *Spurs* long, rough and sharp, a little bending inwards.

His Colour.

THE *Gray pyle*, *Tellow pyle*, or *red* with the black *Breast* is esteemed the best; the *Pide* is not so good, and the *White* and *Dun* worst of all: If he is red about the *Head* like *Scarlet*, 'tis a sign of *Strength*, *Lust* and *Courage*; but if *pale*, 'tis a sign of *Faintness* and *Sickness*.

His Courage.

HIS *Courage* is shewed by his Walk, treading, and the pride of his *going*, and in his *Pen* by his frequent *Crowing*. For the sharpness of his *Heel*, or as *Cock-masters* call it, the narrow *Heel*, is only seen in his Fighting; for that *Cock* is said to be sharp *Heel'd*, or narrow *Heel'd*, which every time he riseth hits, and draws Blood of his Adversary, *guilding* (as they term it) his *Spurs* in Blood, and every Blow threatning the others Death. And such *Cocks* are the best for a sharp *Heel'd Cock*, though he be a little false, is deemed much better than the truest *Cock* that hath a dull *Heel*, and hits seldom. But that *Cock* which is both hard, and very sharp *Heel'd*, is to be esteemed above others; therefore in your Choise choose such a one as is of a strong *Shape*, good *Colour*, true *Valour*, and of a most sharp and ready *Heel*.

Of Breeding.

FOr the Breeding these *Cocks* for *Battle*, it is much different from those of the *Dunghil*, for they are like *Birds of Prey*, in which the *Female* is of better esteem than the *Male*; and so in the Breed of these *Cocks*, be sure that the *Hens* are right, that is, they must be, of a right *Plume*, as *Gray*, *Grissel*, *Speck't*, or *Tellowish*; *Black* or *Brown* is not amiss; their Bodies large, and well pouked behind for large *Eggs*, and well tusted on the Crowns, which shews good Courage: If they have *Weapons*, 'tis the better: Also they must be of a good *Courage*, otherwise their *Chickens* will not be good. And it is observable that the perfect *Hen* from a *Dunghil Cock*, will bring a good *Chicken*; but the best *Cock* from a *Dunghil Hen* can never get a good one.

Thus having got a Breed of perfect *Cocks* and *Hens*, the best Season of the Year to breed in, is from the Increase of the *Moon* in *February*, to the Increase of the *Moon* in *March*; for one *March Bird* is of far greater esteem, than those bred at other times.

Let the *Pen* where she sits be placed warm, with soft sweet *Straw* therein for her Nest, they being much tenderer than the *Dunghil-Hens*; and permit no other *Fowl* to come where she sits, for that will disturb her. You should observe, if she be busie in turning her *Eggs* (being a good sign) if not, do it at such times as she riseth from her *Nest*; and be sure that she hath always *Meat* and *Water* by her, lest when she riseth she should

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ſhould ſtay long to ſeek Food, and ſo her *Eggs* would be chill and ſpoiled: Likewiſe in the place where ſhe *Sits*, let there be *Sand*, *Gravel*, and fine ſifted *Aſhes* to bathe and trim her ſelf in at pleaſure.

In about three *Weeks* ſhe will Hatch, and obſerve, that if ſhe doth not cover and keep the firſt warm till the reſt are Hatcht, take thoſe from her, and keep them warm in *Wool* by the *Fire* until all are Hatcht; and then put them all under her, keeping both the *Hen* and *Chickens* very warm, not ſuffering them to go abroad in the Cold for three Weeks, or a Month, for they are ſo tender that *Cold* will kill them.

Let them have plenty of Food, as *Oatmeal*, *Chee'e-Parings*, fine *ſmall Wheat*, and the like, and a large Room to walk in with a *Boarded Floor*; for that of *Earth*, or *Brick*, is too cold or moiſt. After three or four *Weeks*, let them walk in your *Court-Yard*, or *Garden*, to pick *Worms*, provided there is no *Sinks*, or *Puddles* of ſtinking Water, which is as bad as Poyſon for them to drink, engendring corrupt *Diſeaſes*.

After this manner keep them until you can know the *Cock-Chickens* from the *Hens*; and when you perceive their *Combs*, or *Wattles* to appear, cut them off, anointing the Soar with ſweet *Butter* until well; and this will make them have fine, ſmall, ſlender, and ſmooth *Heads*; whereas if you let the *Combs* grow to their bigneſs, and then cut them off, it will cauſe them to have gouty thick *Heads*, with great *Lumps*; neither is the Flux of *Blood* good, for the leaſt loſs of *Blood* in a feathered *Fowl* is very dangerous.

Let the *Cock-Chickens* go with their *Hens* till they begin to fight with one another; but then ſeparate them into ſeveral *Walks*, and that *Walk* is the beſt that is freeſt from the reſort of others.

Let the Feeding place be upon ſoft dry *Ground*, or upon *Boards*; for to feed them upon *Pavements*, or on *Fliſter-Floors*, will make their *Beaks* blunt and weak, ſo that it will hinder their holding faſt. Any white Corn, as *Oats*, *Barly*, or *Wheat*, is good Food for a *Cock* in his *Walk*; ſo are *Toaſts*, or *Cruſts* of *Bread* ſteept in *Drink*, or *Wine*; for it will both ſcowr and cool them inwardly.

If your *Chickens* begin to *Crow* at about ſix Months old clear and loud, or at unſeaſonable times, 'tis a ſign of Cowardiſe and Falſhood, ſo that they are not worth the rearing; for the true *Cock* is very long before he can get his Voice, and then he obſerves his *Hours*.

To one *Cock* four or five *Hens* are ſufficient; for they are of ſo hot a Nature, and will Tread ſo much, that they ſoon conſume their Natural ſtrength.

At two years old you may put a *Cock* to the *Battle*, as not being before perfect and compleat in every Member; for to ſuffer him to Fight when his *Spurs* are but *Warts*, you may know his Courage, but not his Goodneſs.

You muſt alſo be circumſpect about the *Pearch* whereon he *Rooſteth*; for if it be too ſmall in the gripe, or crooked, or ſo ill placed that he can't ſit without ſtradling, it will make him uneven Heel'd, and by conſequence no good ſtriker. Seeing therefore that the *Perch* is of ſuch conſequence for the marring or making them; the beſt way is to have a row of little *Pearches*, not above ſeven or eight *Inches* long, and about a *Foot* from the Ground, ſo that with caſe they may go up to them; and being ſet, muſt have their *Legs* cloſe, the ſhortneſs of the *Pearch* not admitting otherwiſe: And it is a Maxim, *That he that is a cloſe ſitter, is ever a narrow ſtriker.*

You muſt alſo be careful, that when your *Cock* doth Leap from the *Pearch*, that the Ground be ſoft whereon he ligheth; for hard Ground cauſeth *Gountineſs*.

Of Dyetting and Ordering Cocks.

FOr the *Dyetting* and *Ordering* a *Cock* for the *Battle*, which is the principal thing; (for the beſt *Cock* Undyetted, is not able to encounter with the worſt that is *Dyetted*;) obſerve theſe Directions.

The beſt time to take up your *Cocks* is about the latter end of *Auguſt* (for from that time to the latter end of *May*, *Cocking* is in requeſt) and having viewed them well, and that they are ſound, hard *Feathered*, and full *Summed*, put them into ſeveral *Pens*. Now for the true making them, it were convenient to viſit ſome *Cock-Maſter*; for an ocular ſight is far better than a verbal Direction; only let me tell you, it ſhould be made of cloſe *Boards* well joyn'd together, all but the Fore-front, which muſt be made open, like a *Grate*; the *Bars* about two *Inches* apart; and before the *Grate* two large *Troughs* of ſoft *Wood*, the one for *Water*, and the other for *Meat*; the Door of the *Grate* to be made to lift up and down, and of ſuch largeneſs, as with caſe to put the *Cock* in and out, and to cleanſe the *Pen* daily, to keep it ſweet. The *Pen* ſhould be at leaſt three *foot* high, and two *foot* ſquare; of theſe *Pens* many may be joyned in one Front, according to the uſe you have for them.

For the firſt three or four Days that they are put into their *Pens*, feed them only with old *White Bread*, the Cruſt pared away, and cut into little ſmall ſquare Bits, with which feed them at Sun-riſing, Noon, and Sun-ſet, giving them about an Handful at a time; and be ſure, let them not be without good freſh *Water*.

After they have been thus fed four Days, and their Crops cleared of the *Corn*, *Worms*, and other courſe Feeding, in the Morning take them out of their *Pens*, and putting a pair of *Hots* upon each of their *Heels*, which *Hots* are ſoft bumbaſted Rouls of *Leather* covering their *Spurs*, that they can't hurt or bruiſe one another, and ſo ſetting them down (that is, two at a time) on the *Green Graſs*, let them fight, and buffet each other a good while, provided they do not wound or draw *Blood* of each other, and this is called *Sparring* of *Cocks*. The reaſon of thus exerciſing them is, to chaſe and heat their Bodies, to break the fat and glut within them, and to cauſe it to come away.

Your

Your *Cocks* having *Sparred* ſufficiently, and that you ſee them *Pant*, and grow Weary, take them up, and unty their *Hots*; then being provided with deep *Straw-Baskets*, made for that purpoſe, with ſweet ſoft *Straw* to the middle; put into each Basket a *Cock*, covering him over with the like *Straw* to the top; then put on the *Lid* cloſe, and ſo let him ſtove and ſweat till the Evening: But before you put him into the *Baſket*, give him a pretty big Lump of *ſweet Butter*, with white *Sugar-Candy*, and ſome *Roſemary* finely chopt, and this Scouring will bring away his *Greaſe*, and breed Breath and Strength.

In the Evening (about four or five of the *Clock*) take them out of the *Stoving-Baskets*, and licking their *Heads* and *Eyes* all over, put them into the *Pens*; then take a good Handful of *Bread* ſmall cut, put it to each in their *Troughs*, and Piſs therein, ſo that the *Cocks* may take the *Bread* out of the warm *Urine*, and this will ſcour and cleanſe both their *Heads* and *Bodies* extreamly.

The *Bread* that you muſt now and afterward give them, muſt not be fine *White Bread*; but a fort made for that purpoſe, after this manner. Take half a Peck of *Wheat-Meal*, with the like quantity of fine *Oatmeal*; mix theſe together, and knead them into a ſtiff *Paſt* with *Ale*, the Whites of twelve *Eggs*, and half a Pound of *Butter*. This *Paſt* being well wrought, make into broad thin *Cakes*, and being three or four Days old, and the Bliſterings cut away, cut it into little ſquare *Bits*, and ſo give it the *Cocks*. There be ſome that will mix in the ſaid Bread *Licorice*, *Annice-ſeeds*, with other hot *Spices*; but this is not good, as making them too hot at Heart, ſo that when they come to the latter end of a *Battel*, they are overcome with their heat.

Having fed your *Cocks* thus all the Night after their *Sparring*, the next day let them reſt, only give them their ordinary Feedings of *Bread* and *Water*; then the next day (which is the ſecond day after their *Sparring*) take them into a fair even green *Cloſe*; there ſet down one of them, and having a *Dunghill Cock* in your *Arms*, ſhew it him, running from him, enticing him to follow you; and ſo chaſe him up and down for about half an hour, ſuffering him now and then to have a ſtroak at him; and when you ſee him well heated and panteth, take him up and carry him to his *Pen*, the like do with the reſt, and there give him this Scouring: Take freſh *Butter* (that is without *Salt*) half a Pound, beat it in a *Mortar*, with the Leaves of *Herb* of *Grace*, *Hyſſop*, and *Roſemary*, until the *Herbs* are incorporated therein, and that the *Butter* is brought to a green *Salve*, and of this give the *Cock* a Roul or two, as big as he can well ſwallow; then *Stove* him in the *Basket*, as aforeſaid, until the Evening; then take him out, put him in his *Pen*, and feed him as before directed.

The next *Day* let him reſt and feed, and the *Day* following *Spar* him again; and this Method obſerve every other Day for the firſt Fortnight to *Spar*, or *Chaſe* him, as being the moſt natural and kindlieſt *Heats*; but forget not to give him a Scouring after every *Heat* as aforeſaid, for the breaking and cleanſing him from *Greaſe*, *Glut* and *Filth*, which lying in his Body cauſeth Purſineſs and Faintneſs, ſo that he can't ſtand out the latter end of a *Battel*.

Thus having fed your *Cock* the firſt Fortnight, obſerve the ſame Rules the next Fortnight; but for a *Week* do not *Spar* him, or give him *Heats*, above twice a *Week*, ſo that three or four times in the Fortnight will be ſufficient; and each time *Stove* and *Scour* him according to the nature of his *Heats*, long *Heats* requiring longer *Stoving*, as alſo greater *Scouring*. But if you find him in good Breath, and requires but ſlight *Heats*, then ſtove him the leſs, and give him the leſs *Scouring*.

For the third Fortnight, which compleats the ſix Weeks (which is ſufficient to prepare a *Cock* for *Battel*) feed him as aforeſaid; but *Spar* him not at all for fear of making his *Head* tender and ſore, neither give him any violent exerciſe, but only two or three times in the *Fortnight*, let him moderately be chaſt up and down to maintain his *Wind*; and now and then *Cuff* a *Cock*, which you muſt hold to him in your hands; which done give him his *Scouring* well roul'd up in Powder of *Brown Sugar Candy*; for the *Cock* being now come to his perfect Breath, and clear from filth in his Body, the *Sugar Candy* prevents that Sickneſs which the *Scouring* would then cauſe, and alſo ſtrengthens Nature againſt the *Medicine*.

Matching and Fighting Cocks.

THe ſix Weeks Feeding being finiſhed, and finding your *Cock* in *luſt* and *breath*, he is fit to *fight*; always obſerving that he have at leaſt three Days reſt before Fighting, and be well emptied of Meat before you bring him into the *Pit*.

Being brought into the *Pit*, your chief care muſt be in the *Matching* him, in which conſiſts the greateſt glory of a *Cock-Maſter*; therefore in your *Matching* there are two things to be conſidered, *viz.* the *Strength* of *Cocks*, and the *Length* of *Cocks*; for if he be too ſtrong, he will over-bear your *Cock*, not permitting him to riſe, or ſtrike with any advantage; and if he be too long, your *Cock* ſhall hardly catch his *Head*, ſo that he can neither endanger *Eye*, nor *Life*. Now for the knowledge of theſe two *Rules*, as for his *Strength*, 'tis known by the thickneſs of his Body, that *Cock* being held ſtrongeſt which is largeſt in the *Garth*, which may be eaſily known by the meaſuring him with your *Fingers*; and as for his *Length*, 'tis as eaſily known by griping him about the middle, cauſing him to ſtretch forth his *Legs*; but if you doubt loſe in the one, yet ſure to gain in the other, you may venture a *Match*.

Your *Cock* being match'd thus, prepare him to the *Battle*: Firſt, with a pair of fine *Cock-Sheers* cut off all his *Main* cloſe to his *Neck*, from his *Head* to the ſetting on of his *Shoulders*; then clip off all the *Feathers* from his *Tail* cloſe to his *Rump*, which the more *Scarlet* it appears, the better eſtate of Body he is in: Then take his

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Wings, extending them forth by the first *Feather*, clip the rest slopewise with sharp Points, that in his rising he may endanger the *Eyes* of his Adversary; then with a sharp *Knife* scrape smooth, and sharpen his *Beak*; and also smooth, and sharpen his *Spurs*: And lastly, see that there be no *Feathers* about the *Crown* of his *Head* for his Adversary to take hold of, and then with your *Spittle* moisten his *Head* all over, and so turn him into the *Pit* to try his Fortune.

The *Battle* being ended, your first business must be to search his *Wounds*, and such as you find, suck out the *Blood* with your Mouth; then wash them with warm *Urine* to keep them from rankling, and presently give him a bit or two of your best *Scouring*, and so *Stove* him up as hot as you can for that Night; and in the Morning take him forth, and if you see his *Head* much swell'd, suck them with your Mouth as aforesaid, and *bathe* them with warm *Urine*. Then having the Powder of the Herb *Robert* well dryed and finely sifted, Pounce all the Sore places therewith, and give him a good handful of *Bread* to eat out of warm *Wine*, and then put him into the *Stove* again, as before directed, being very careful that no Air come to him till the *Swelling* is gone; but twice a day suck and dress his Wounds, feeding him as aforesaid.

But if your *Cock* hath received any hurt in his *Eye*, then take a *Leaf* or two of right *Ground-Ivy*, that is, such as grows in little Tufts in the bottom of *Hedges*; chew this in your *Mouth* very well, sucking out the Juice, which squirting into his *Eye* two or three times will soon cure it, provided the sight is not pierced; and it will also preserve the *Eye* from *Films*, *Haws*, *Warts*, &c.

If your *Cock* hath Veined himself either by narrow Striking, or other cross Blow, find out the Wound, and presently bind unto it the soft Down of a *Hare*, and it will both stanch it, and cure it.

After your *Wounded Cocks* are put forth to their *Walks*, as being fit to go abroad, and when you come to visit them in about a *Month* or two after, if you find any hard swelling Bunches about their *Heads*, blackish at one end, 'tis a sign of unsound *Cores*; and then with a sharp *Pen-Knife* open them, and crush out the said *Cores*; then suck out all the Corruption, and fill the Holes with *fresh Butter*, which will perfect the Cure.

And thus much for *Cock-fighting*.

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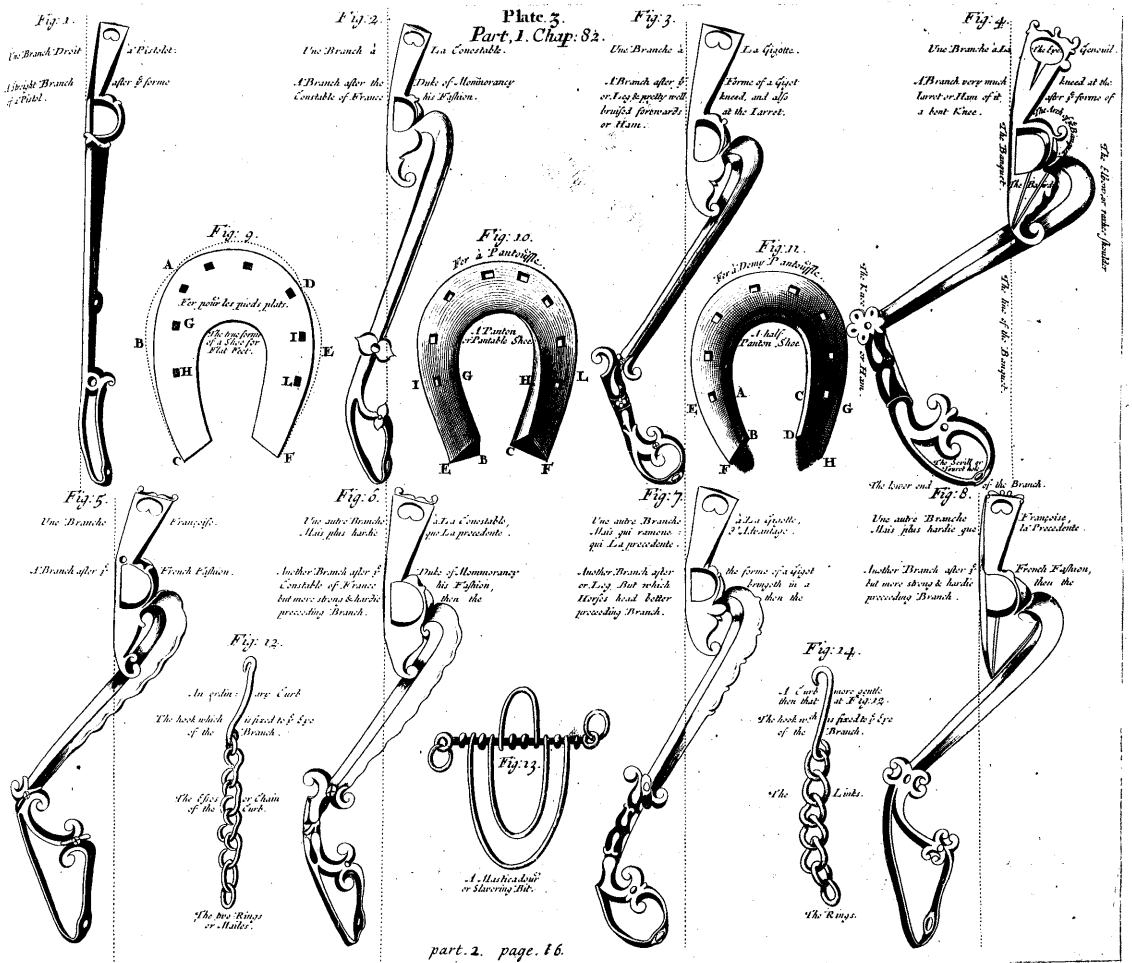
And the better to know the different *Aids*, let him take notice and remember, that there is in the *Managed Horse* two Motions, *viz.* that of the *Shoulders*, and that of the *Haunch*; now that of Shoulder is governed by the *Hand*, and that of the Haunch by the *Heel*.

The motion of the *Hand* is thus, if he turns to the right, he must turn his *Bridle-hand*, so that his Nails come upwards, removing it little or nothing out of the place: if to the left, he must keep it in its own natural posture without turning, only moving it a little to the left. In both these motions he must feel his *Horse's Mouth*, and work it insensibly as occasion requires. When a *Horse* carries his head in the right place, and stedy, his Neck pliant, and obeys these *Aids* readily, we say he is well in the *Hand*.

The motion of the *Heel* is as follows; when he is *Galloping* upon the *Volte*, *Demi-volte* or the like, and would have his *Horse* keep his *Croup* inwards (which is necessary) he must stretch out his *Leg* on that side to which he turns, and move the other nearer to the *Horses Belly*, so that he may feel the motion. If he would make his *Horse* go sideways upon a right line, he must first put his Shoulders in motion, and then give the same *Aids* with his *Legs* as before, and when ever his *Horse* (of himself, as by any accident) throws his *Croup* this way or that way, by moving one of his *Legs* to him, and stretching out the other, he will rectifie him. A *Horse* that is well *Managed* will obey these *Aids*, if rightly given, and then we say he is well in the *Heel*.

In these *Aids* of the *Hand*, and the *Heel*, lies the Art of making a *Managed Horse* perform all his *Lessons* with exactness, which is not so easy a thing as some imagine, who think if a *Horse* be perfect, the *Rider* has nothing to do but sit still upon his Back; because if he doth but sit fast, and keep in Action, they look after no more, not heeding whether he guides the *Horse*, or the *Horse* him. But let an ill Horseman be upon never so good a *Horse* and never so well managed, if he Rides before a good *Judge*, or Fights with a good *Horseman*, his weakness will certainly appear. Let him therefore that begins to Learn, make it his first business to get a good Seat, a true and exact posture, without stifness, or affectation, to gain which, let him add his own observation to his Masters directions, and making choice of some well shaped Person (who is known to be a fine *Horseman*) let him observe his *posture* and *motions*, endeavouring to imitate them, for we are apt to learn faster from Examples before our eyes, than from the best directions that can be given.

In the next place let him endeavour to get a just hand upon a *Horse*, and to give his *Aids* true, and *à propos*, which must be done by a constant application, and a good Memory; and by working with his *Head*, as well as his *Body*. And lastly, I would advise him to stick to it till he is so far Master of a Horse, that he is not only able to Ride one that is Managed to his hand, but to teach a young *Horse* himself. For though the teaching a young Horse be too great a drudgery for



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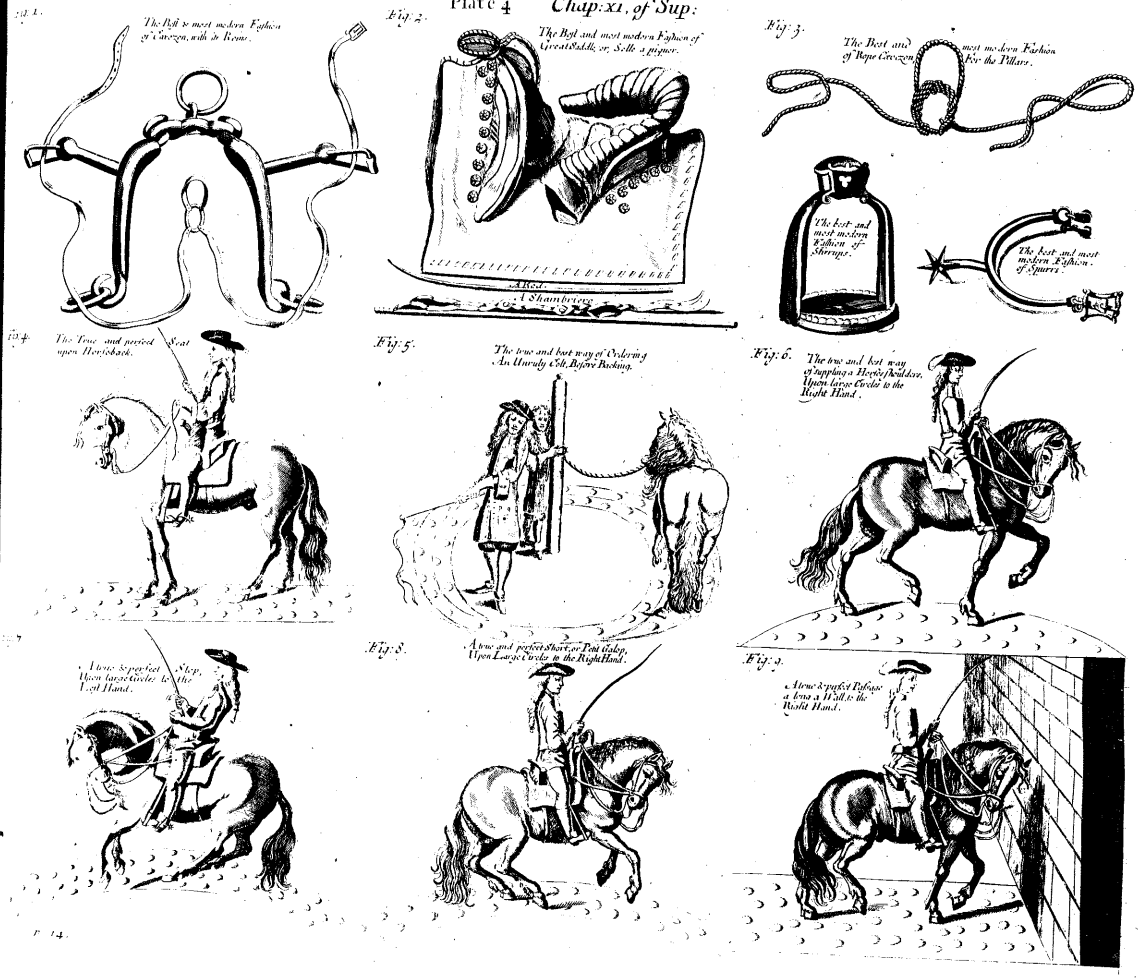

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Fig: 1.

A true and perfect Passage upon narrow Circles to the Left Hand.

Fig: 2.

A true and perfect Terra a Terra upon large Circles Terra a Terra Square to the left Hand.

Fig: 3.

A true and perfect Pirouet to the right Hand.

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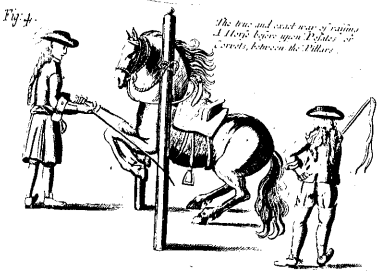
Fig: 4.



The true and exact way of training A Horse before upon Pedale or Curvets, between the Pillars.

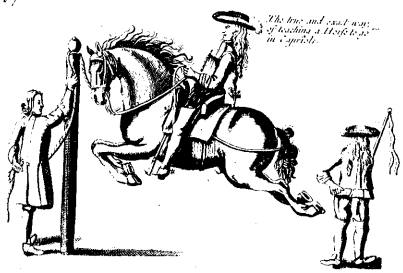
Fig: 5.

The true and exact way of training a Horse before upon Pedale or Curvets without the Help of the Pillars.

Fig: 6.

The true and exact way of teaching A Horse all Kind of Terra a Terra, by the help of one Single pillar only.

Fig: 7

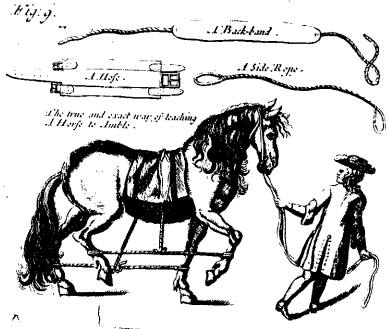


The true and exact way of teaching a Horse to go in Capriole.

Fig: 8.

The true and exact way of teaching A Horse to go in Croupade.

Fig: 9.



The true and exact way of teaching A Horse to Amble.

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